Elecraft K3 Schematics

This document contains the schematics for the Elecraft K3 Transceiver and its internal options. The schematics are preceded by a Block Diagram for context.

The schematics are ordered as the basic K3/10, then various options.

BLOCK DIAGRAM

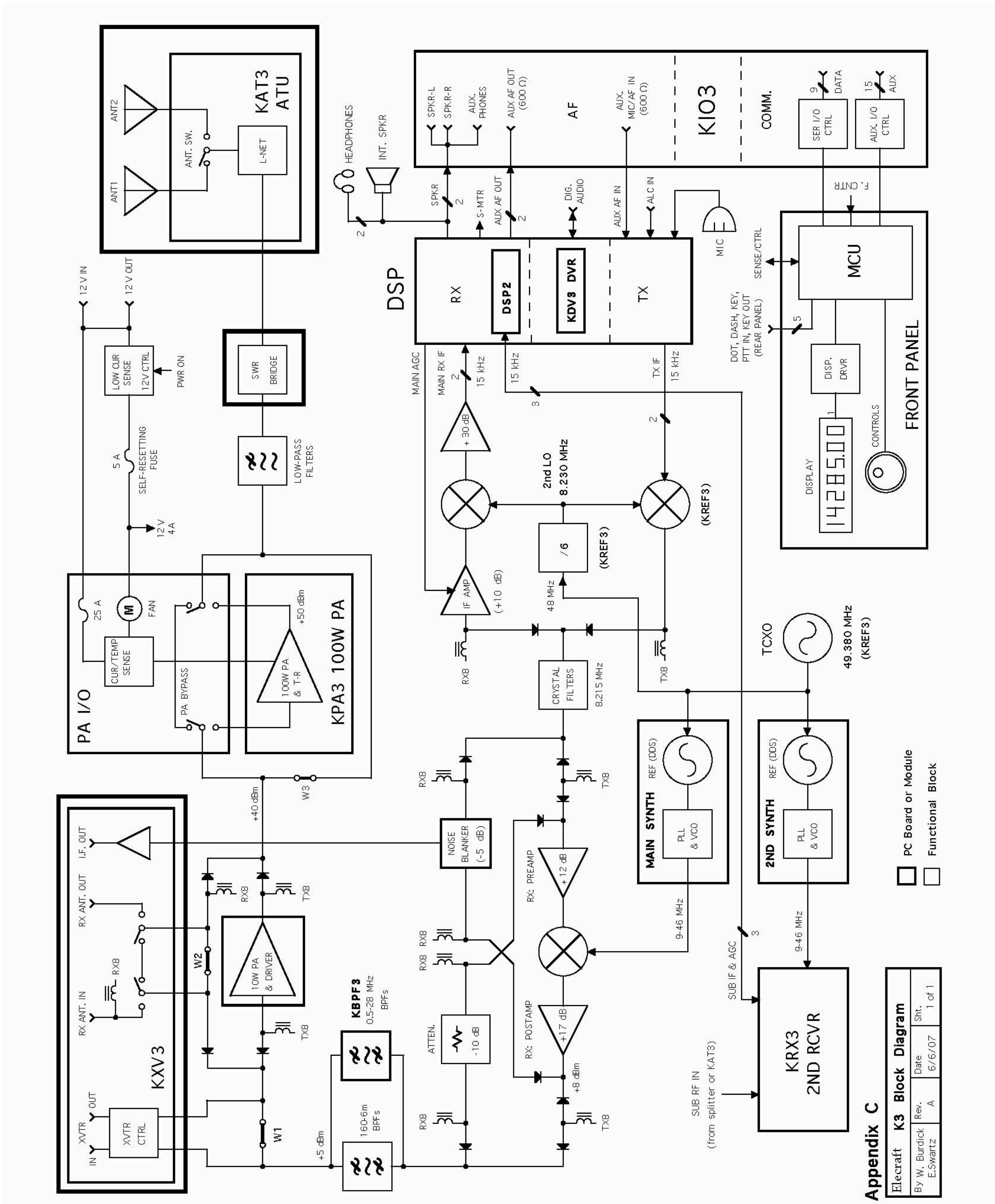
K3/10

RF Board	Main module
Band Stop Filter	1st IF rejection
Mixer	High dynamic range 1st mixer
Crystal Filter	Roofing filter
KIO3	I/O module
KANT3	Antenna Connector if no KPA3 installed
KNB3	Pre-IF Noise Blanker
KREF3	Reference oscillator, Tx mixer/Filter, Rx 2nd Mixer
KSYN3	Synthesizer
Front Panel	Control logic
DSP	Digital Signal Processing
DSP LPF	Optional retrofit for earlier DSP boards
10-watt PA	Low power amplifier

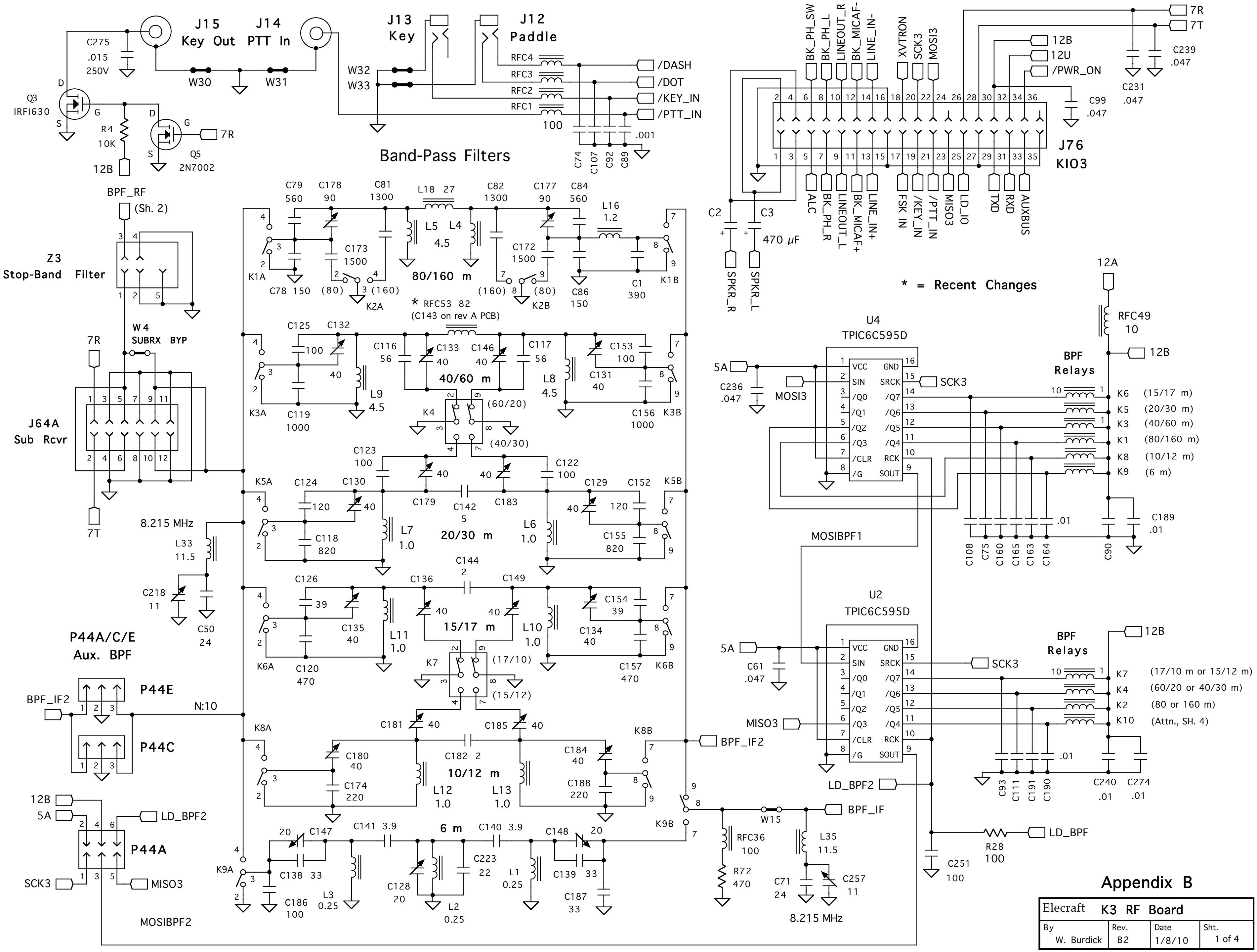
OPTIONS

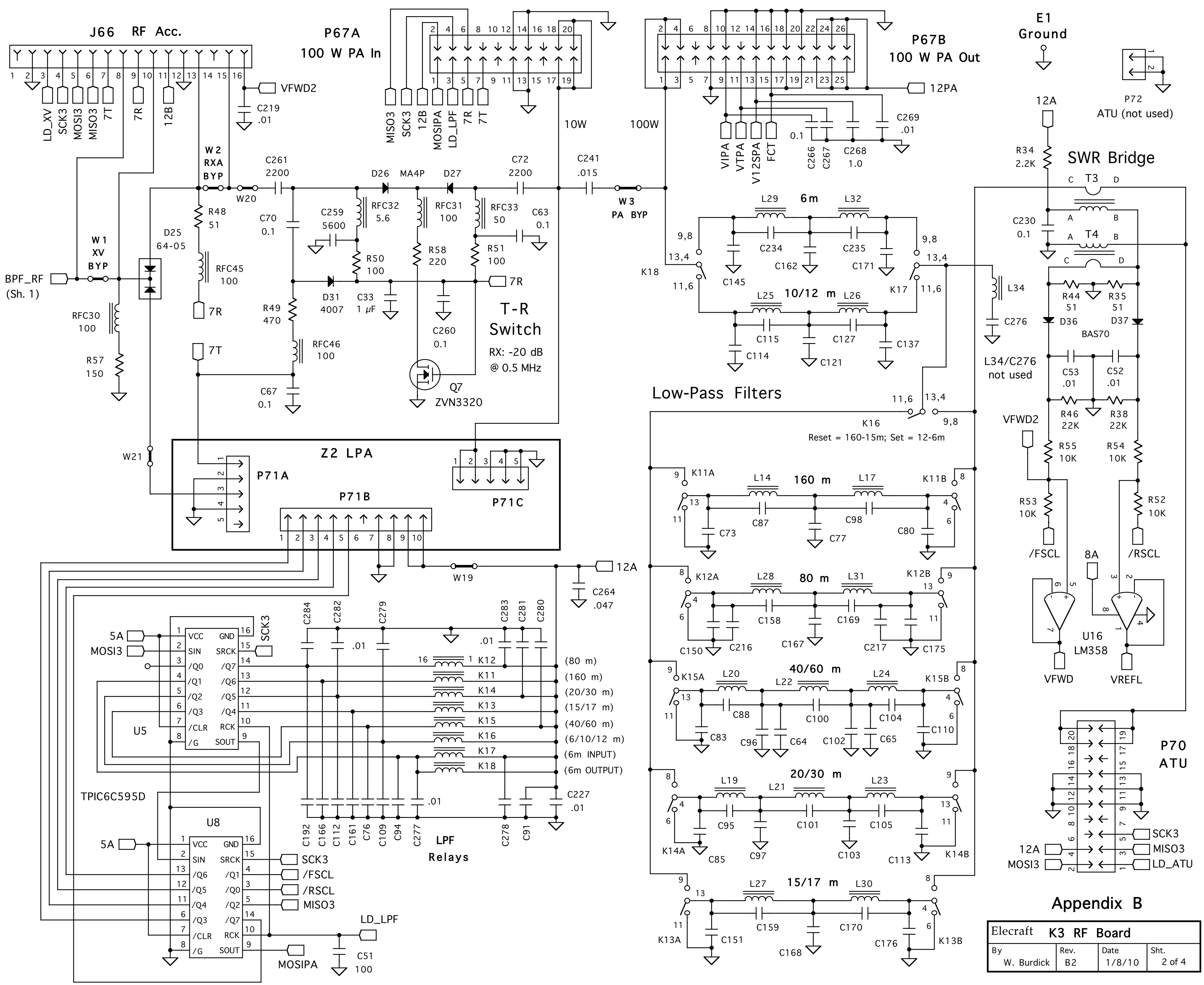
KBPF3	General Coverage Receiver Bandpass Filters
KXV3	Transverter Interface and Receive Antenna Switching
KXV3A	Transverter Interface and Rx Ant Switch w/K144XV Support
KAT3	100-watt Antenna Tuner
DVR	Digital Voice Record/Playback
KPAIO3	Part of 100-watt PA
KPA3	Part of 100-watt PA
AuxDSP	Part of KRX3 Second Receiver
KRX3	Part of KRX3 Second Receiver
K144XV	Internal 2m Module

K3 Block Diagram

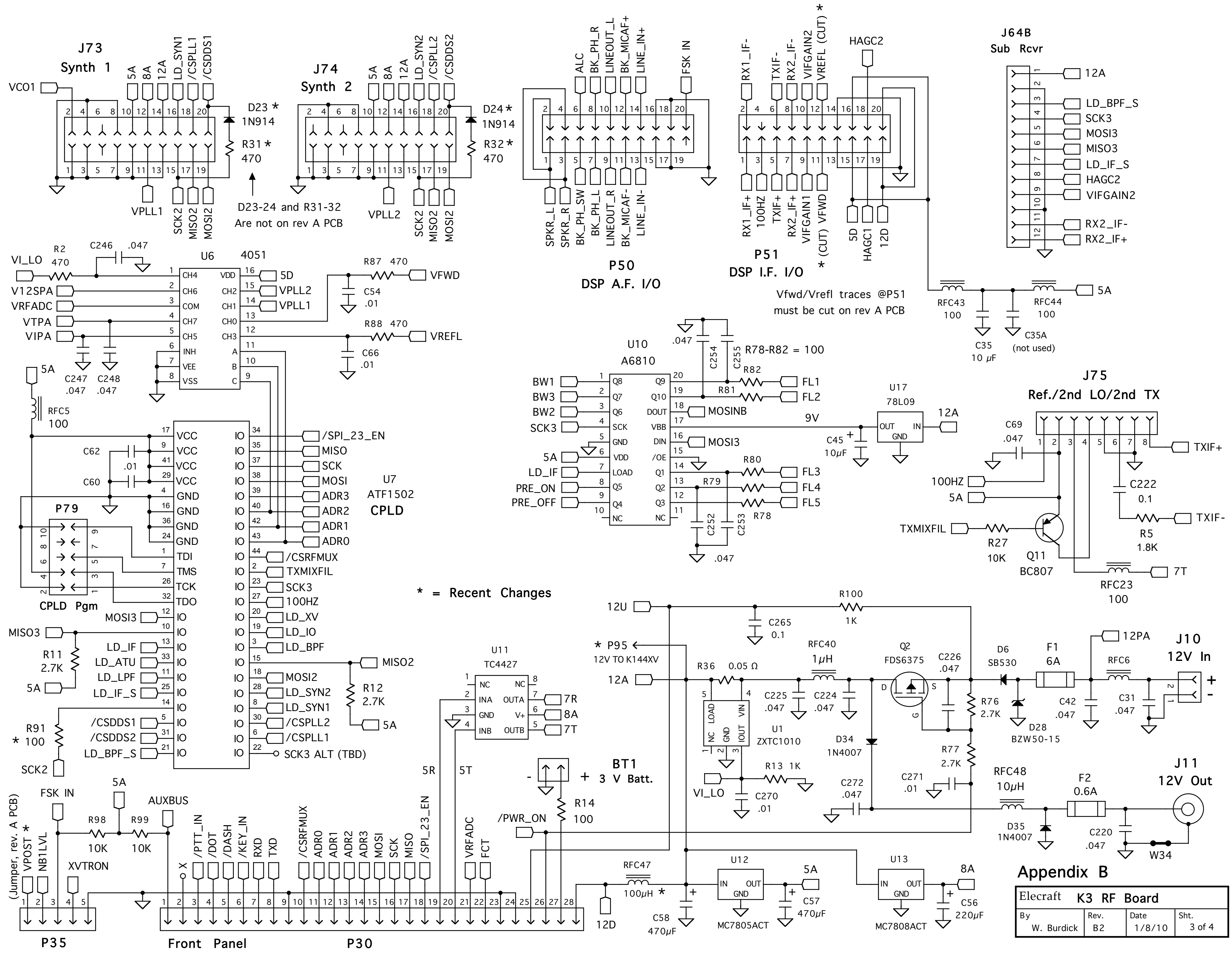


RF CHOKE RFC53 & C143 MOD

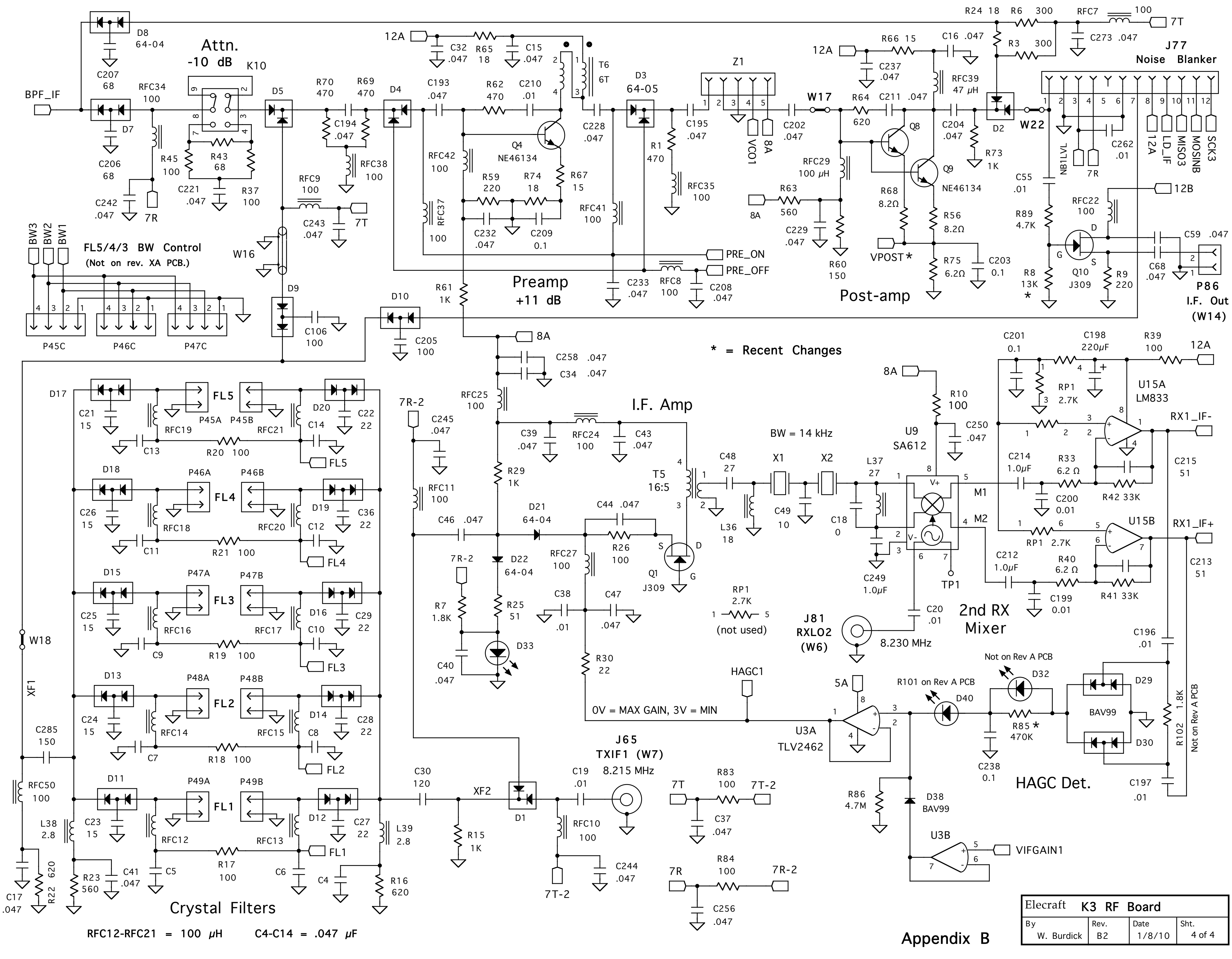




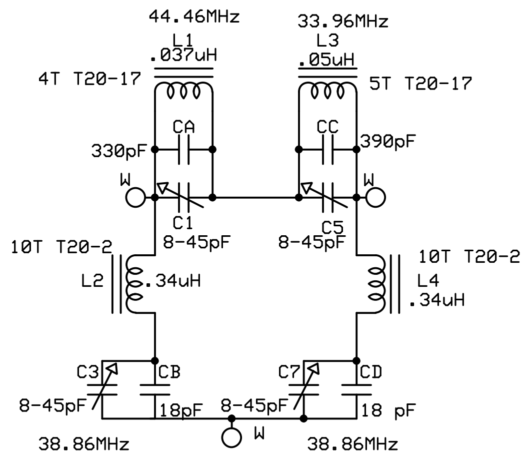
J66 RF Acc.
P67A 100 W PA In
P67B 100 W PA Out
E1 Ground
P72 ATU (not used)
SWR Bridge
T-R Switch
RX: -20 dB @ 0.5 MHz
Q7 ZVN3320
Low-Pass Filters
Reset = 160-15m; Set = 12-6m
L34/C276 not used
Z2 LPA
P71A
P71B
P71C
6m
10/12 m
160 m
80 m
40/60 m
20/30 m
15/17 m
U5
TPIC6C595D
U8
U16 LM358
LPF Relays
(80 m)
(160 m)
(20/30 m)
(15/17 m)
(40/60 m)
(6/10/12 m)
(6m INPUT)
(6m OUTPUT)
P70 ATU
W1 XV BYP
W2 RXA BYP
W3 PA BYP
BPF_RF (Sh. 1)
VFWD2
VFWD
VREFL
/FSCL
/RSCL
LD_LPF
MOSIPA
10W
100W
Appendix B
Elecraft K3 RF Board
By W. Burdick
Rev. B2
Date 1/8/10
Sht. 2 of 4



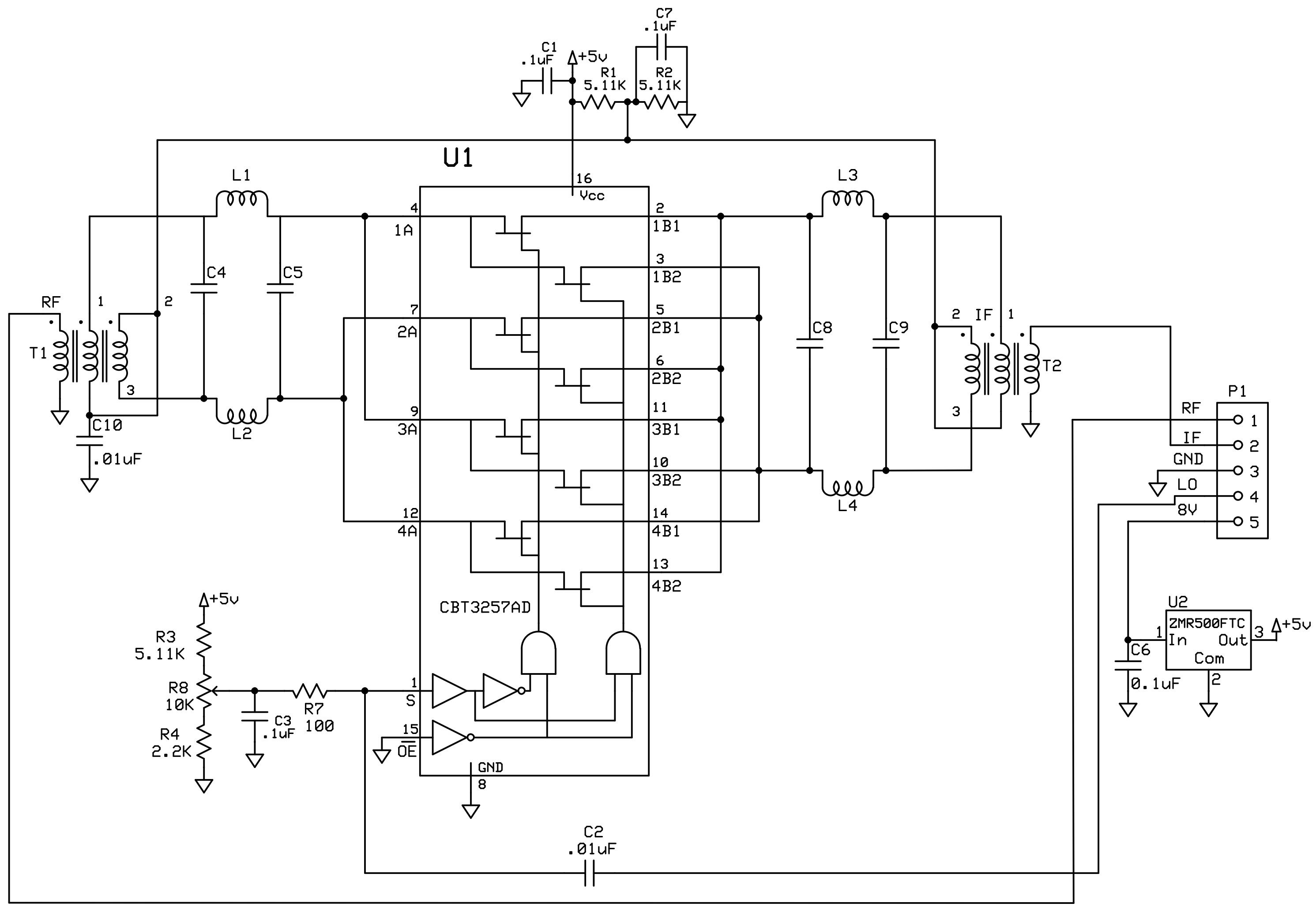
J73
Synth 1
VCO1
5A
8A
12A
LD_SYN1
/CSPLL1
/CSDDS1
D23 *
1N914
R31 *
470
VPLL1
SCK2
MISO2
MOSI2
D23-24 and R31-32
Are not on rev A PCB
J74
Synth 2
LD_SYN2
/CSPLL2
/CSDDS2
D24 *
1N914
R32 *
470
VPLL2
ALC
BK_PH_R
LINEOUT_L
BK_MICAF+
LINE_IN+
FSK IN
SPKR_L
SPKR_R
BK_PH_SW
BK_PH_L
LINEOUT_R
BK_MICAF-
LINE_IN-
P50
DSP A.F. I/O
RX1_IF-
TXIF-
RX2_IF-
VIFGAIN2
VREFL (CUT) *
HAGC2
RX1_IF+
100HZ
TXIF+
RX2_IF+
VIFGAIN1
(CUT) VFWD
5D
HAGC1
12D
P51
DSP I.F. I/O
*
Vfwd/Vrefl traces @P51
must be cut on rev A PCB
J64B
Sub Rcvr
12A
LD_BPF_S
SCK3
MOSI3
MISO3
LD_IF_S
HAGC2
VIFGAIN2
RX2_IF-
RX2_IF+
RFC43
100
C35
10 µF
C35A
(not used)
RFC44
100
5A
VI_LO
R2
470
C246
.047
U6
4051
V12SPA
VRFADC
VTPA
VIPA
C247
.047
C248
.047
5D
VPLL2
VPLL1
R87 470
VFWD
C54
.01
R88 470
VREFL
C66
.01
5A
RFC5
100
C62
.01
C60
P79
CPLD Pgm
U7
ATF1502
CPLD
/SPI_23_EN
MISO
SCK
MOSI
ADR3
ADR2
ADR1
ADR0
/CSRFMUX
TXMIXFIL
SCK3
100HZ
LD_XV
LD_IO
LD_BPF
MISO2
MOSI2
LD_SYN2
LD_SYN1
/CSPLL2
/CSPLL1
SCK3 ALT (TBD)
R12
2.7K
5A
MOSI3
MISO3
R11
2.7K
5A
LD_IF
LD_ATU
LD_LPF
LD_IF_S
R91
* 100
SCK2
/CSDDS1
/CSDDS2
LD_BPF_S
* = Recent Changes
U10
A6810
.047
C254
C255
R78-R82 = 100
BW1
BW3
BW2
SCK3
5A
LD_IF
PRE_ON
PRE_OFF
R82
FL1
R81
FL2
MOSINB
MOSI3
R80
FL3
R79
FL4
FL5
R78
C252
C253
.047
9V
U17
78L09
12A
C45
10µF
J75
Ref./2nd LO/2nd TX
C69
.047
TXIF+
100HZ
5A
C222
0.1
TXMIXFIL
R27
10K
Q11
BC807
R5
1.8K
TXIF-
RFC23
100
7T
12U
C265
0.1
R100
1K
* P95
12V TO K144XV
12A
R36 0.05 Ω
RFC40
1µH
Q2
FDS6375
C226
.047
D6
SB530
F1
6A
12PA
J10
12V In
RFC6
C225
.047
C224
.047
U1
ZXTC1010
R76
2.7K
D28
BZW50-15
C42
.047
C31
.047
D34
1N4007
R77
2.7K
R13 1K
VI_LO
C270
.01
C272
.047
C271
.01
RFC48
10µH
F2
0.6A
J11
12V Out
D35
1N4007
C220
.047
W34
U11
TC4427
7R
8A
7T
5R
5T
BT1
3 V Batt.
R14
100
/PWR_ON
FSK IN
5A
AUXBUS
R98
10K
R99
10K
(Jumper, rev. A PCB)
VPOST *
NB1LVL
XVTRON
X
/PTT_IN
/DOT
/DASH
/KEY_IN
RXD
TXD
/CSRFMUX
ADR0
ADR1
ADR2
ADR3
MOSI
SCK
MISO
/SPI_23_EN
VRFADC
FCT
P35
Front Panel
P30
RFC47
100µH *
12D
C58
470µF
U12
MC7805ACT
5A
C57
470µF
U13
MC7808ACT
8A
C56
220µF
Appendix B
Elecraft
K3 RF Board
By
W. Burdick
Rev.
B2
Date
1/8/10
Sht.
3 of 4



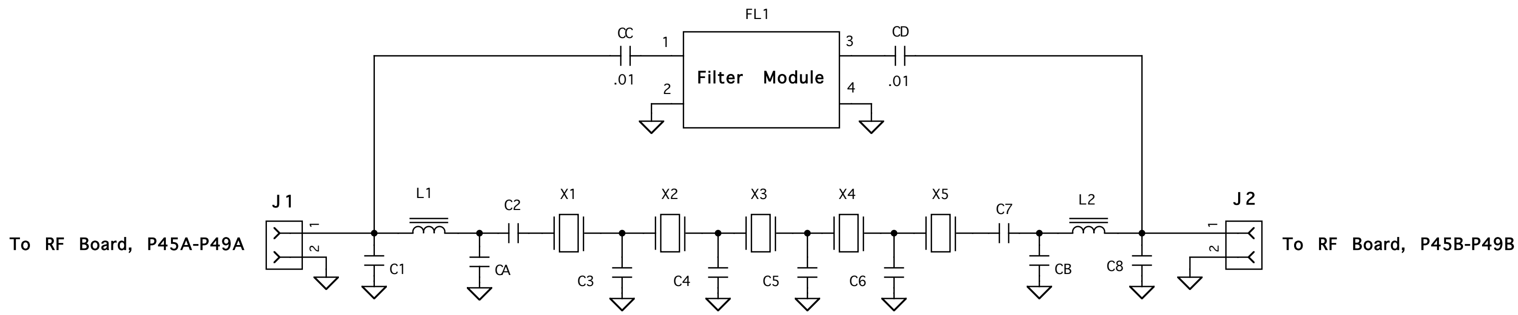
Attn.
-10 dB
K10
BPF_IF
Preamp
+11 dB
PRE_ON
PRE_OFF
Post-amp
VPOST*
Noise Blanker
J77
P86
I.F. Out
(W14)
FL5/4/3 BW Control
(Not on rev. XA PCB.)
BW3
BW2
BW1
P45C
P46C
P47C
* = Recent Changes
I.F. Amp
BW = 14 kHz
U9
SA612
2nd RX
Mixer
J81
RXLO2
(W6)
8.230 MHz
RX1_IF-
RX1_IF+
U15A
LM833
U15B
RP1
2.7K
(not used)
0V = MAX GAIN, 3V = MIN
HAGC1
U3A
TLV2462
U3B
VIFGAIN1
HAGC Det.
Not on Rev A PCB
R101 on Rev A PCB
J65
TXIF1 (W7)
8.215 MHz
FL5
FL4
FL3
FL2
FL1
Crystal Filters
RFC12-RFC21 = 100 µH
C4-C14 = .047 µF
Elecraft
K3 RF Board
By
W. Burdick
Rev.
B2
Date
1/8/10
Sht.
4 of 4
Appendix B



Elecraft		
Bandstop Filter		
Bob Friess	Rev XA 1/25/2007	Page 1 of 1



Elecraft		
KR MIXER		
W. Burdick	Rev XC 2/11/2007	Page 1 of 1



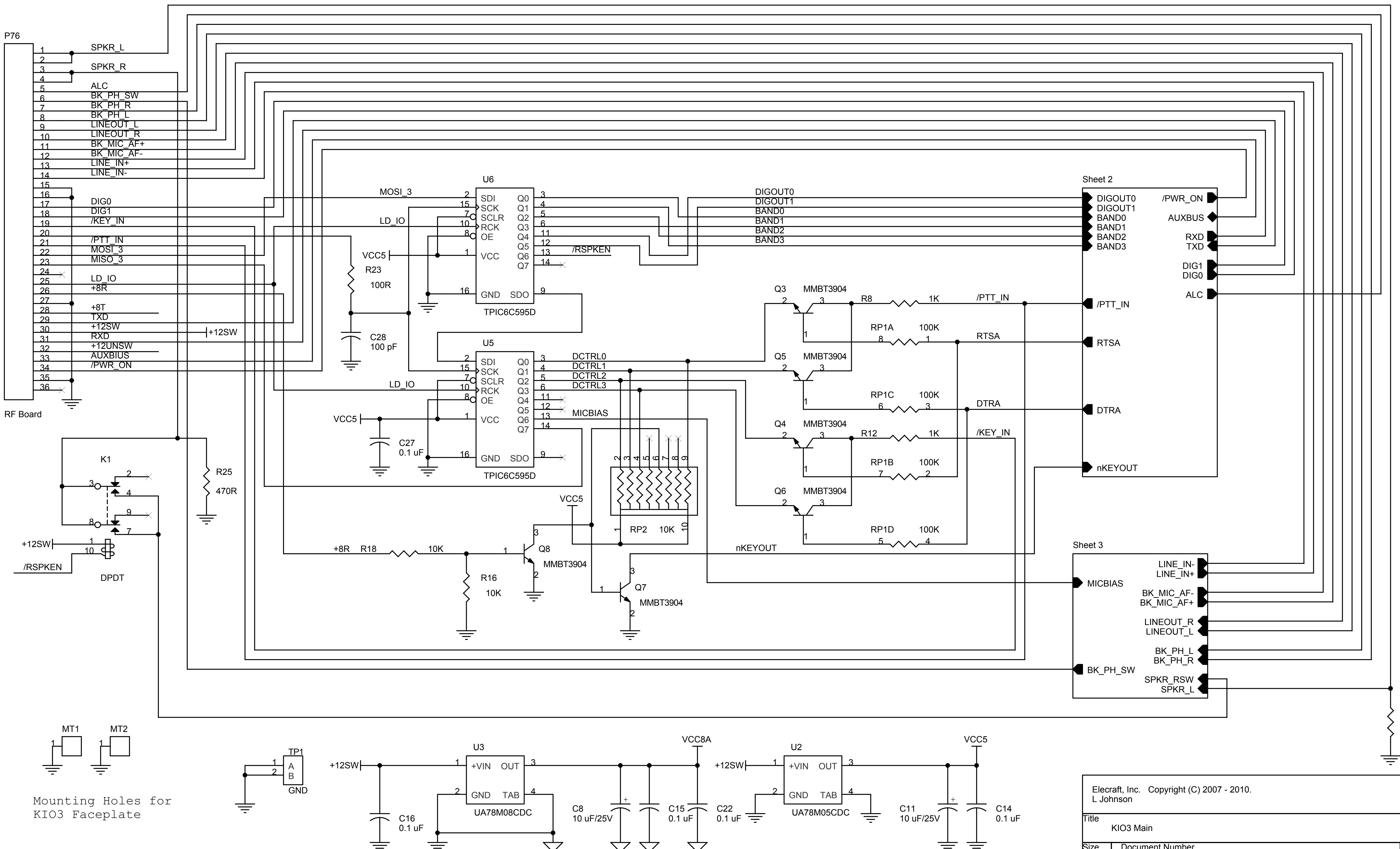
NOTES:

1. This PCB can be used to assemble a discrete 5-pole crystal filter, or as a carrier for filter modules (INRAD, etc.).
2. CC and CD are used with a filter module (FL1). All other components are only used for constructing a discrete filter.
3. X1-X5 can be either 2- or 3-lead HC49/U types. Grounding pads are provided for both.

Fc	Zin/out	BW @ -6 dB	C1,C8	C2	C3	C4	C5	C6	C7	CA,CB	L1, L2	Crystal p/n, Inductor Windings, Notes
8.215 MHz	500 Ω	200 Hz	120 pF	2700 pF	620 pF	1000 pF	1000 pF	620 pF	2700 pF	0 pF	2.8 μH	E660027
8.215 MHz	500 Ω	250 Hz	150 pF	750 pF	750 pF	750 pF	750 pF	750 pF	750 pF	0 pF	2.3 μH	E660027
8.215 MHz	500 Ω	500 Hz	120 pF	470 pF	390 pF	470 pF	390 pF	470 pF	390 pF	0 pF	2.8 μH	E660027; L1, L2 = 24 T #28 on T30-2
8.215 MHz	500 Ω	1000 Hz	63 pF	180 pF	240 pF	180 pF	240 pF	180 pF	240 pF	0 pF	3.9 μH	E660027
8.215 MHz	500 Ω	2700 Hz	0 pF	110 pF	47 pF	68 pF	68 pF	51 pF	68 pF	0 pF	short	E660032
8.215 MHz	500 Ω	3000 Hz	0 pF	51 pF	51 pF	51 pF	51 pF	short	51 pF	0 pF	short	E660032 (4-crystal filter w/1dB ripple; X5 = short)
8.215 MHz	500 Ω	3000 Hz	0 pF	62 pF	47 pF	62 pF	47 pF	short	62 pF	0 pF	short	E660032 (4-crystal filter w/0.5 dB ripple; X5 = short)
8.215 MHz	500 Ω	6000 Hz	0 pF	62 pF	47 pF	62 pF	47 pF	short	62 pF	10 pF	16 μH	X1, X3, X5 = E660027; X2, X4 = E660032

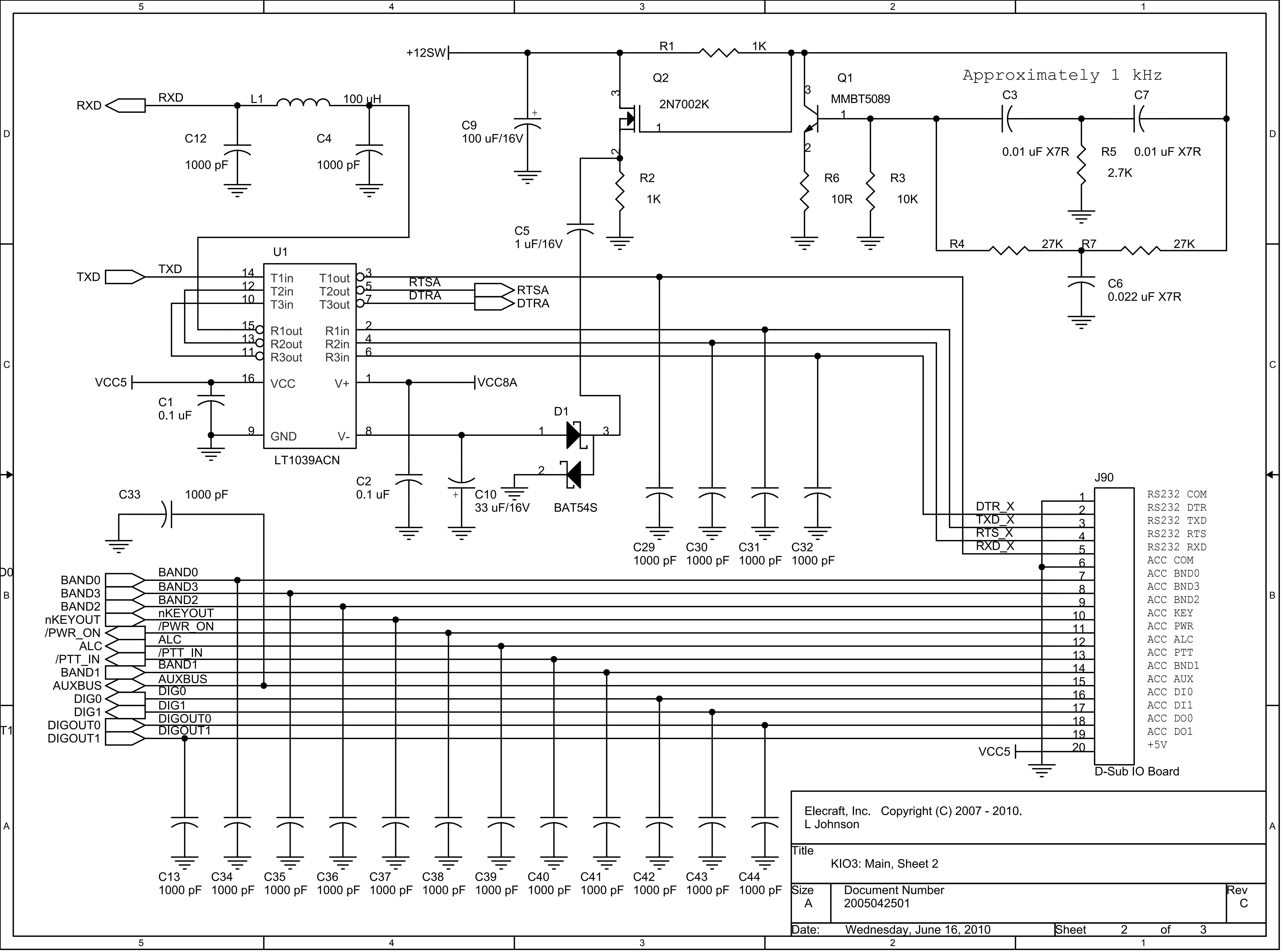
* E660027: 8.214 MHz +/- 200 Hz; Lm = 25 mH +/- 2 mH, Co < 4 pF, Q > 100 K
E660032: 8.2125 MHz +/- 200 Hz; Lm = 25 mH +/- 2 mH, Co < 4 pF, Q > 100 K
For CW bandwidths, X1-X5 must be hand-selected to 10 Hz, and for SSB bandwidths, 50 Hz.

Elecraft	KFL3A Filter Board		
By W. Burdick, E. Swartz	Rev. B	Date 6/20/07	Sht. 1 of 1

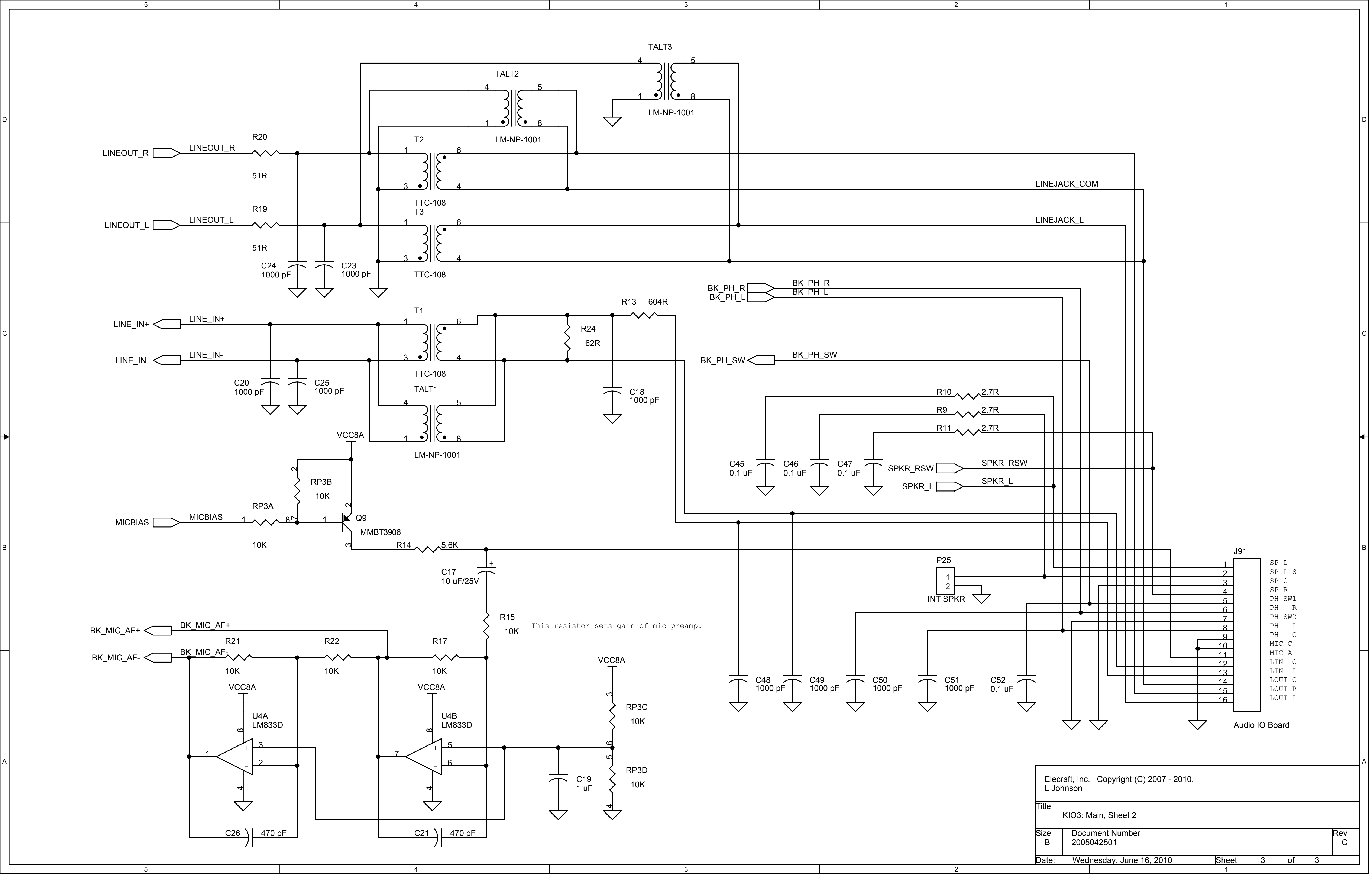


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Title	KIO3 Main
Size	B
Document Number	2005042501
Rev	C
Date:	Wednesday, June 16, 2010
Sheet	1 of 3

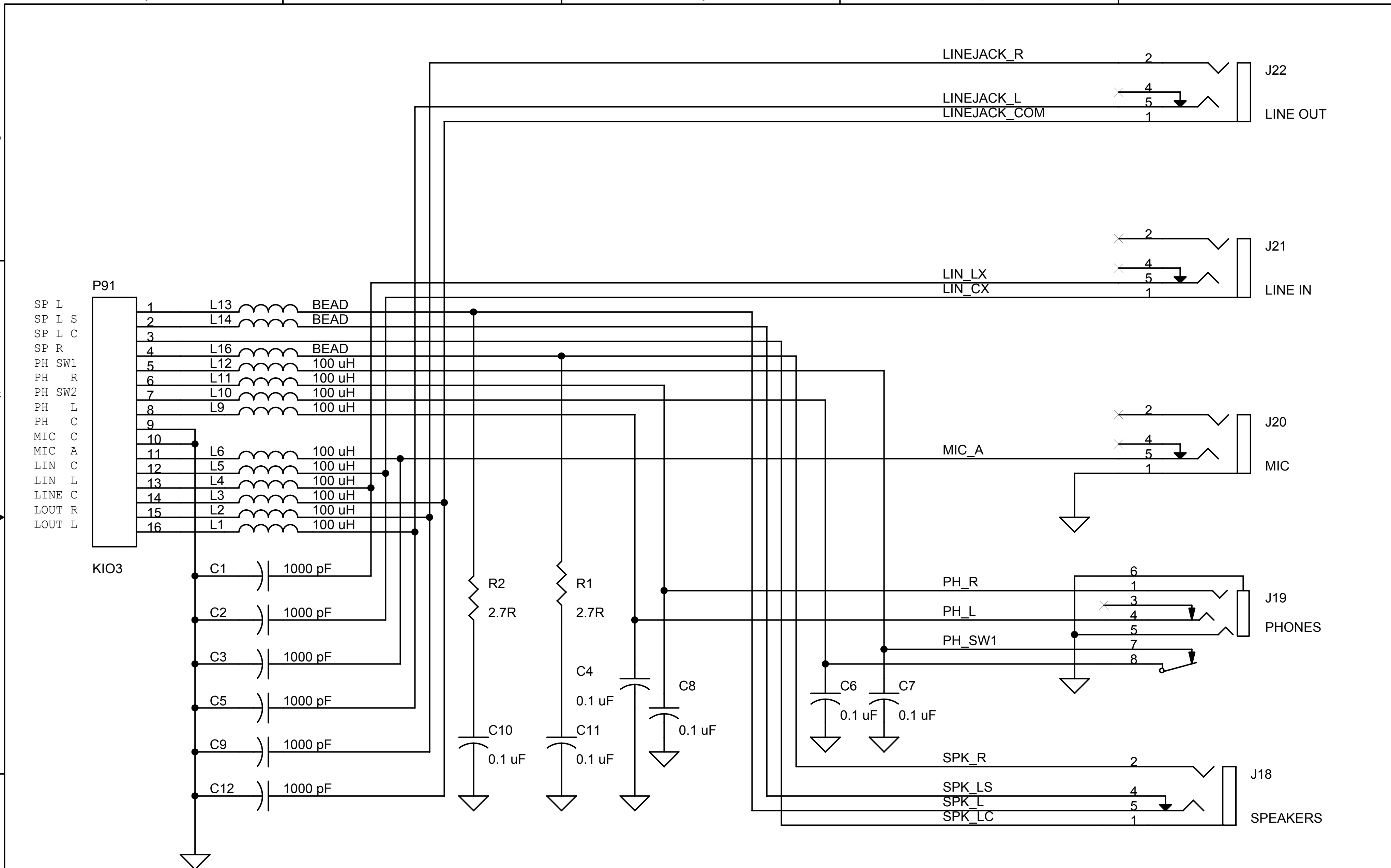


Approximately 1 kHz
+12SW
R1 1K
Q2 2N7002K
Q1 MMBT5089
C3 0.01 uF X7R
C7 0.01 uF X7R
R5 2.7K
C9 100 uF/16V
R2 1K
R6 10R
R3 10K
R4 27K
R7 27K
C6 0.022 uF X7R
C5 1 uF/16V
RXD
L1 100 uH
C12 1000 pF
C4 1000 pF
U1 LT1039ACN
TXD
T1in T2in T3in R1out R2out R3out VCC GND
T1out T2out T3out R1in R2in R3in V+ V-
RTSA
DTRA
VCC5
VCC8A
C1 0.1 uF
C2 0.1 uF
C10 33 uF/16V
D1 BAT54S
C29 1000 pF
C30 1000 pF
C31 1000 pF
C32 1000 pF
C33 1000 pF
J90 D-Sub IO Board
DTR_X
TXD_X
RTS_X
RXD_X
RS232 COM
RS232 DTR
RS232 TXD
RS232 RTS
RS232 RXD
ACC COM
ACC BND0
ACC BND3
ACC BND2
ACC KEY
ACC PWR
ACC ALC
ACC PTT
ACC BND1
ACC AUX
ACC DI0
ACC DI1
ACC DO0
ACC DO1
+5V
BAND0
BAND3
BAND2
nKEYOUT
/PWR_ON
ALC
/PTT_IN
BAND1
AUXBUS
DIG0
DIG1
DIGOUT0
DIGOUT1
C13 1000 pF
C34 1000 pF
C35 1000 pF
C36 1000 pF
C37 1000 pF
C38 1000 pF
C39 1000 pF
C40 1000 pF
C41 1000 pF
C42 1000 pF
C43 1000 pF
C44 1000 pF
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Title
KIO3: Main, Sheet 2
Size A
Document Number 2005042501
Rev C
Date: Wednesday, June 16, 2010
Sheet 2 of 3



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Title	KIO3: Main, Sheet 2	
Size: B	Document Number: 2005042501	Rev: C
Date: Wednesday, June 16, 2010	Sheet 3 of 3	

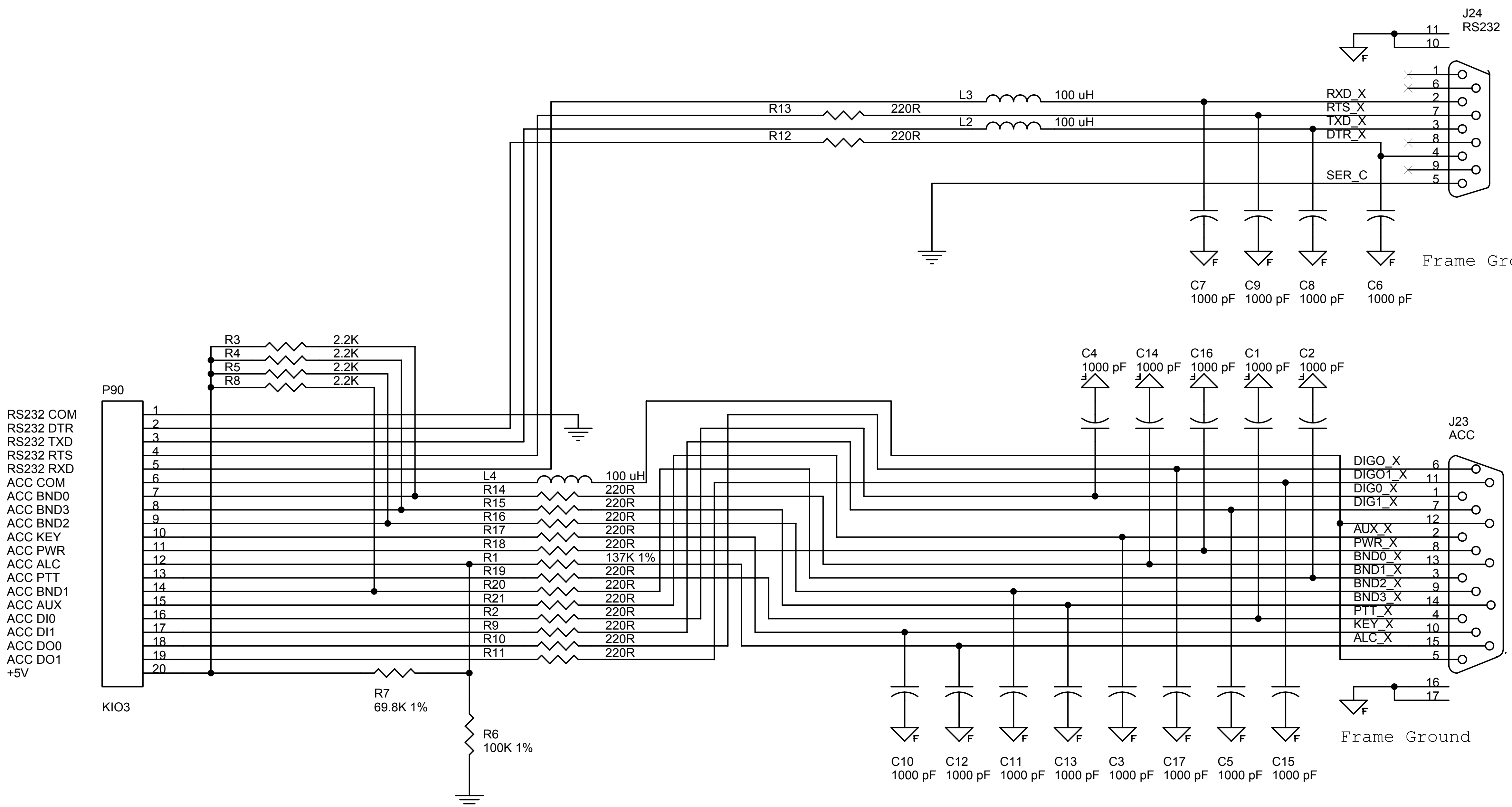


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Title
KIO3: Audio IO Board

Size	Document Number	Rev
A	2005042501	A

Date: Wednesday, June 16, 2010 Sheet 1 of 1



DE9 PIN	FUNCTION	DIRECTION
2	RXD_OUT	--->
7	RTS_IN	<---
3	TXD_IN	<---
4	DTR_IN	<---
5	COMMON	

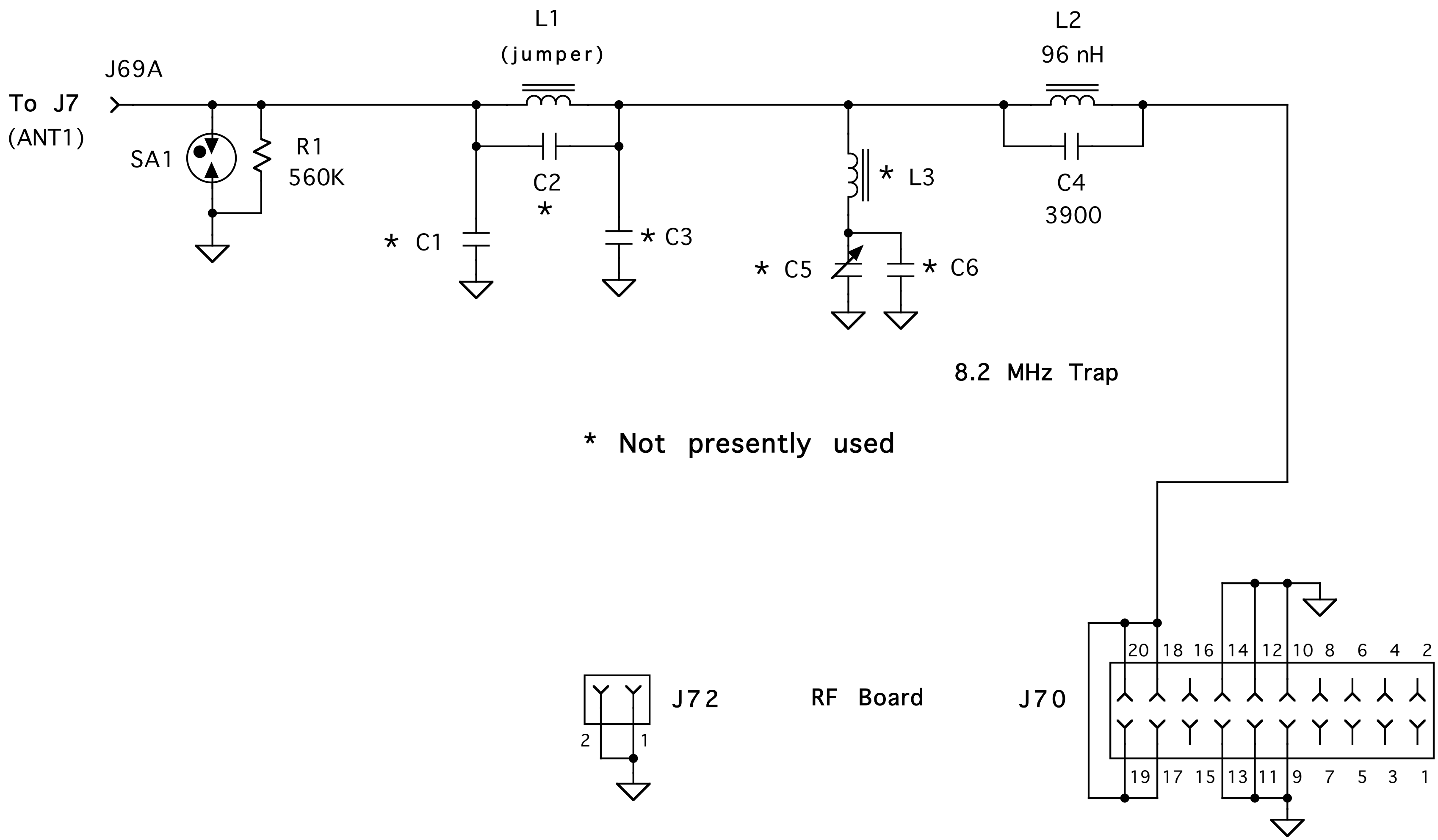
ACC PIN	FUNCTION	DIRECTION
6	DIG_OUT_0	--->
11	DIG_OUT_1	--->
1	FSK_IN	<---
7	XVTR_ON	--->
12	COMMON	
2	AUXBUS	<-->
8	PWR_ON	<---
13	BANDOUT_0	--->
3	BANDOUT_1	--->
9	BANDOUT_2	--->
14	BANDOUT_3	--->
4	PTT_IN	<---
10	KEYOUT_LP	--->
15	ALC_IN	<---
5	COMMON	

L Johnson

Title: KIO3: D Sub RS232 IO Board

Size: B | Document Number: 2005042501 | Rev: B.1

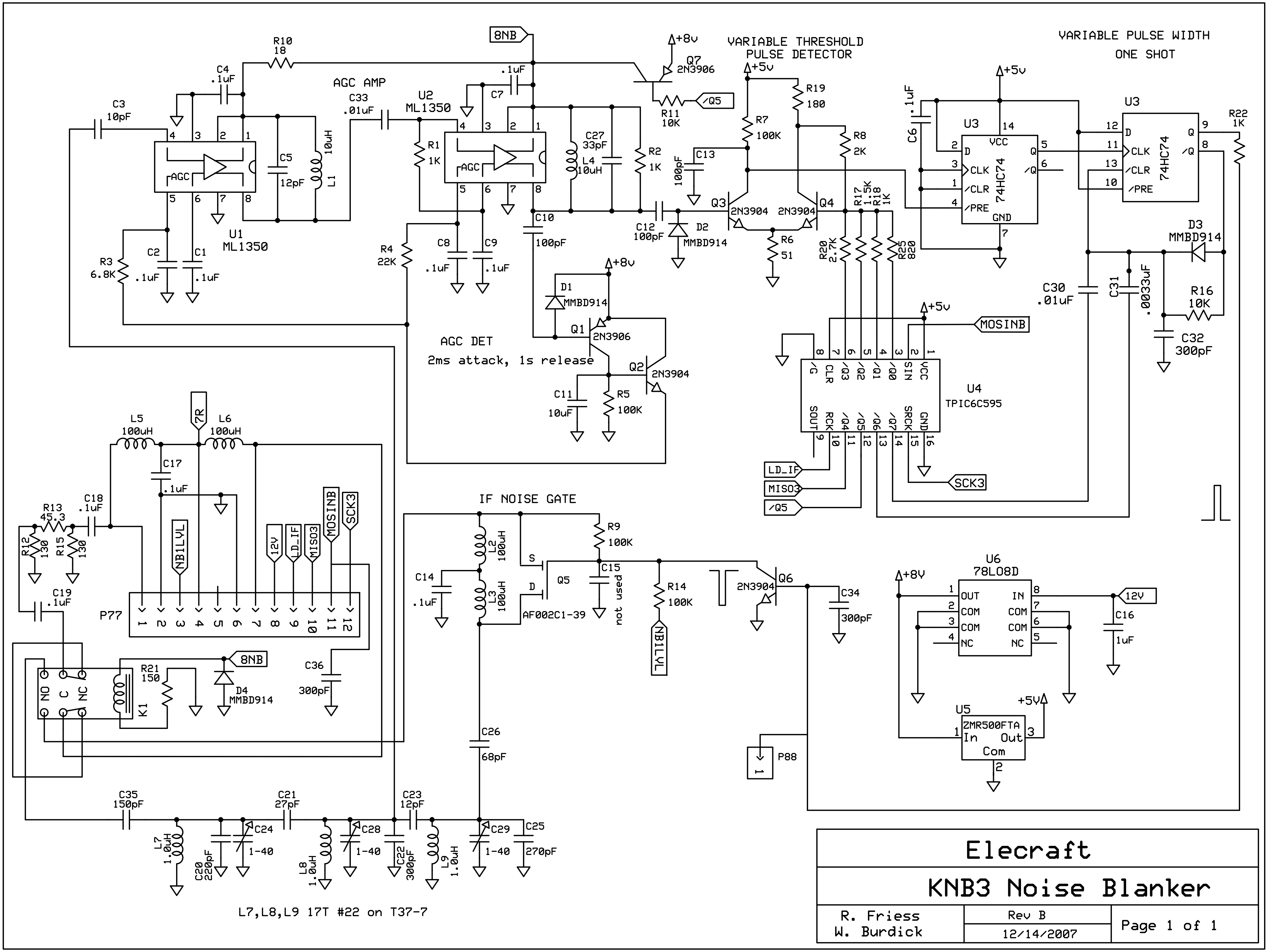
Date: Wednesday, June 16, 2010 | Sheet 1 of 1



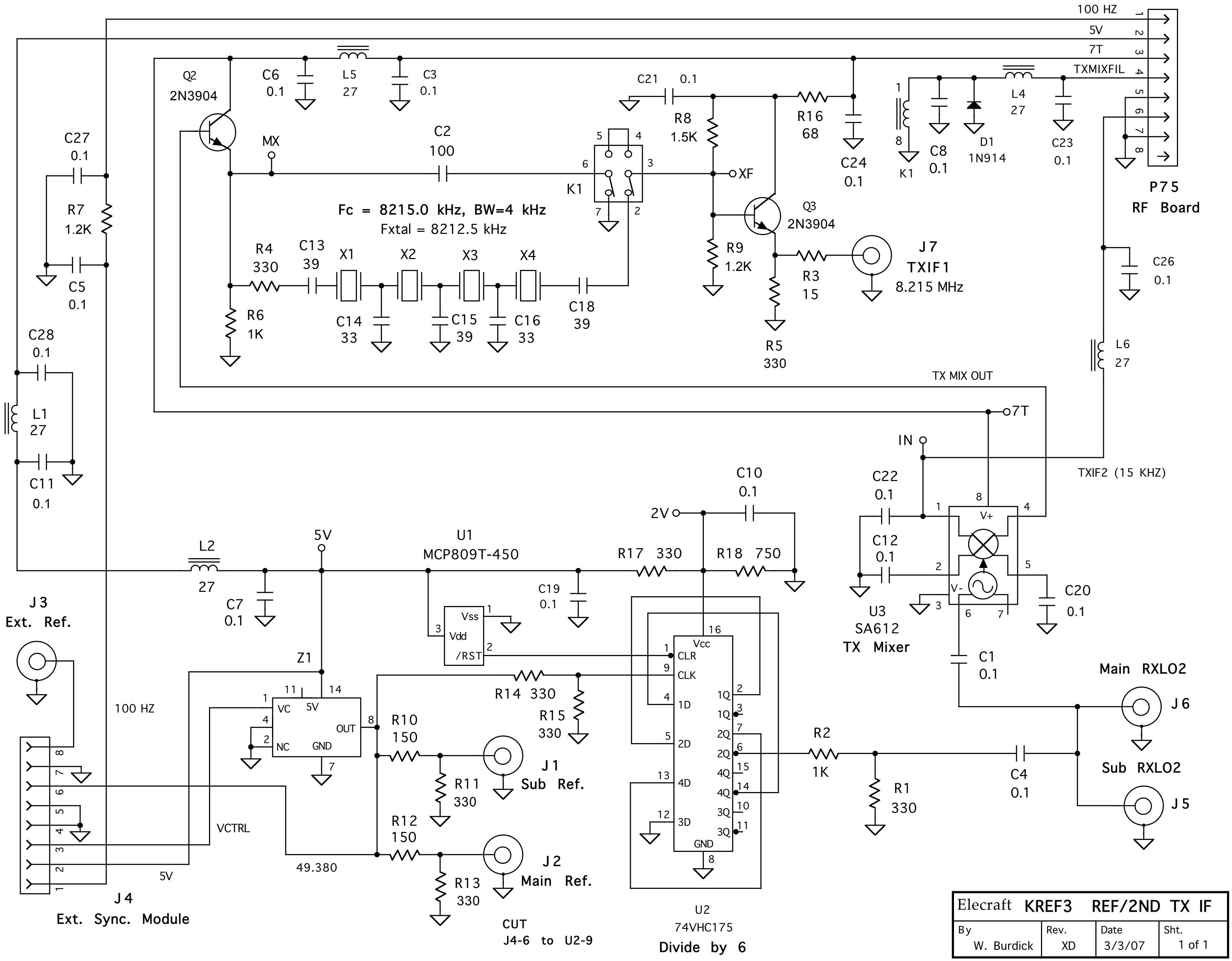
NOTES:

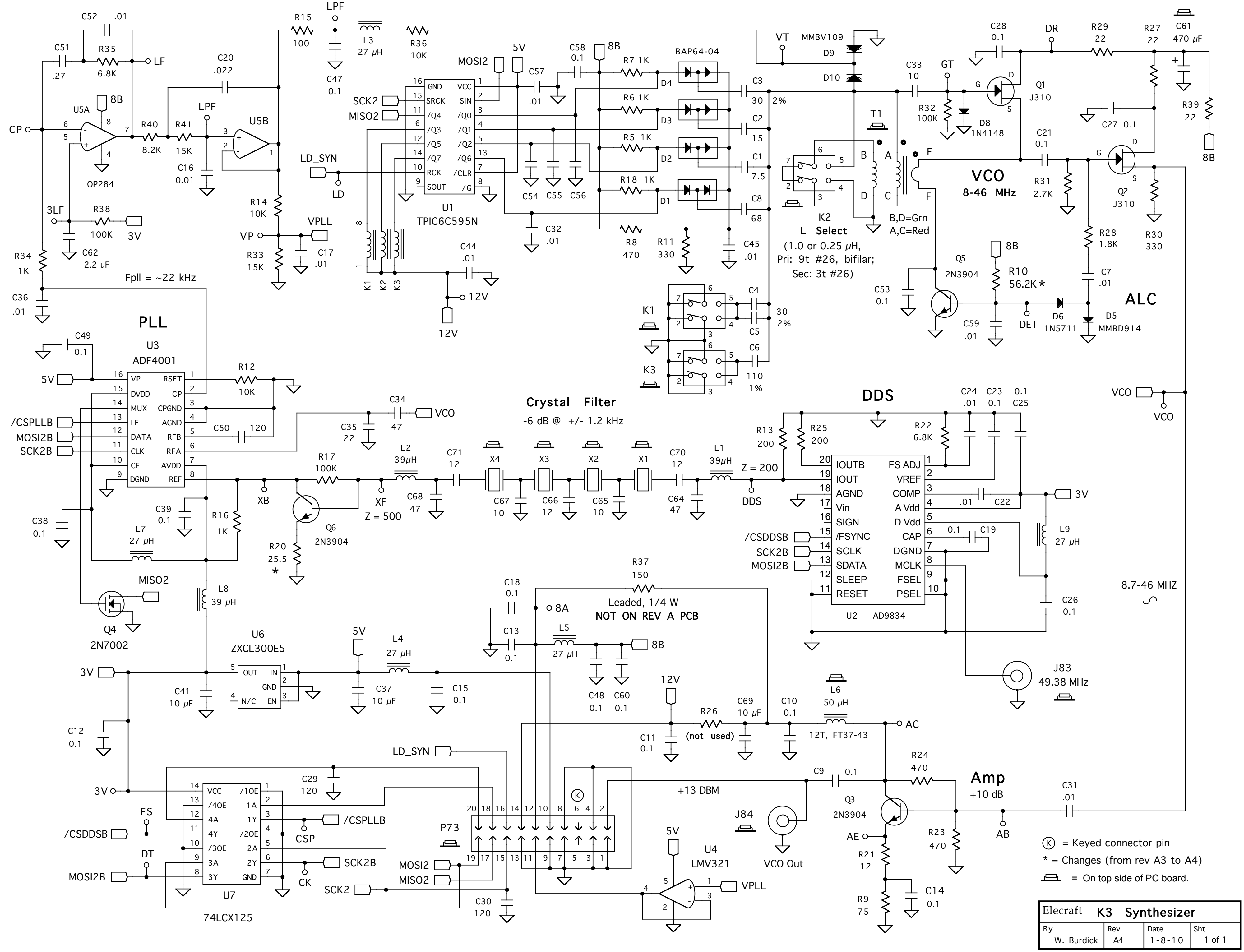
1. All parts are through-hole.
2. Adjust L2 and C5 for minimum 8.215-MHz leakthrough.
3.  = mounted on bottom side of PCB.

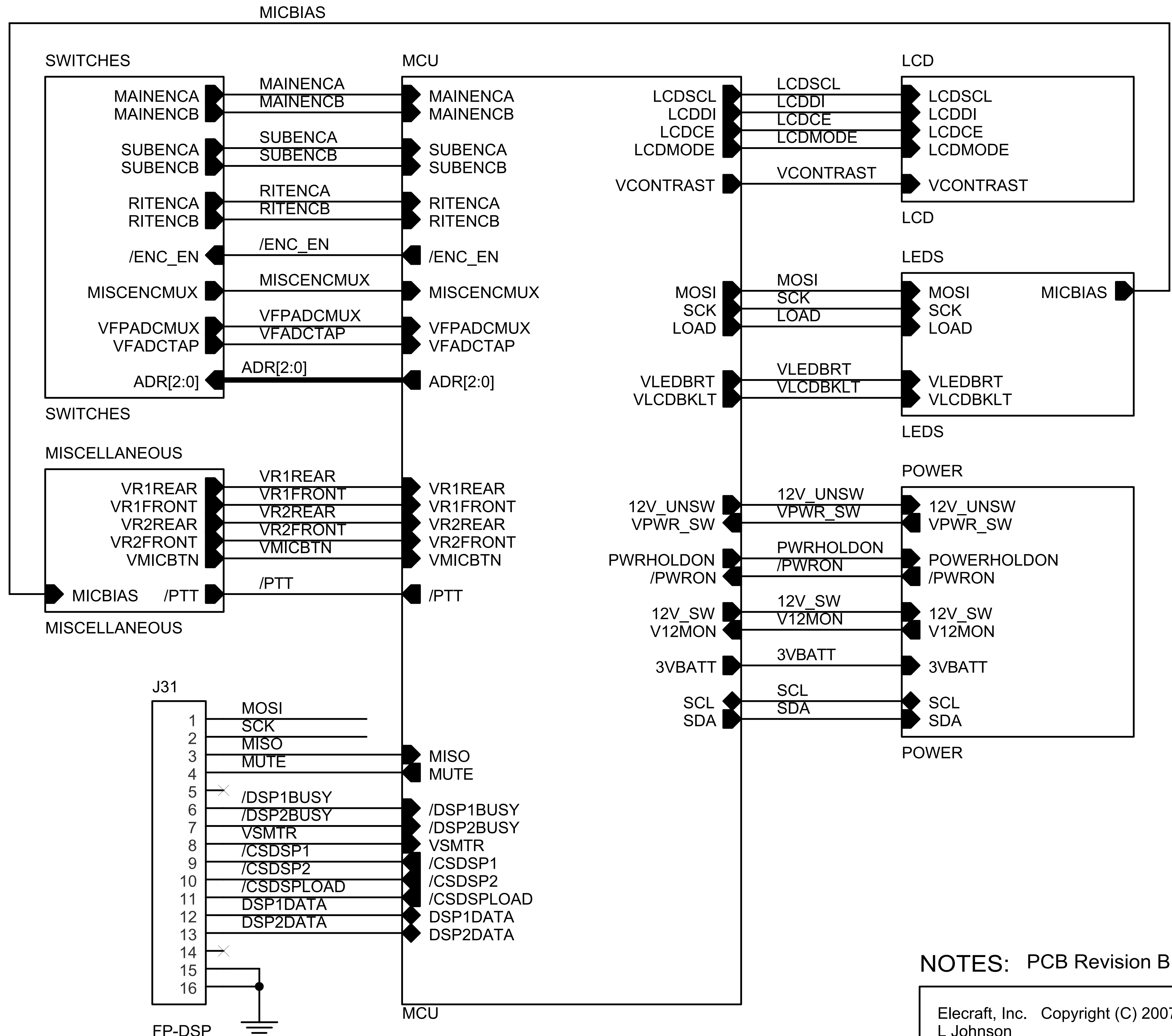
Elecraft KANT3 Ant. Input Module			
By W. Burdick R. Friess	Rev. XC	Date 10/13/08	Sht. 1 of 1



C:\Projects\K3\Schematics\NOISE BLANKERrevB.sch - Sheet1


100 HZ
5V
7T
TXMIXFIL
P75
RF Board
Q2
2N3904
C6
0.1
L5
27
C3
0.1
C27
0.1
R7
1.2K
C5
0.1
MX
C2
100
K1
C21
0.1
R8
1.5K
XF
R16
68
C24
0.1
K1
C8
0.1
D1
1N914
L4
27
C23
0.1
Fc = 8215.0 kHz, BW=4 kHz
Fxtal = 8212.5 kHz
R4
330
C13
39
X1
X2
X3
X4
C14
33
C15
39
C16
33
C18
39
R6
1K
Q3
2N3904
R9
1.2K
R3
15
R5
330
J7
TXIF1
8.215 MHz
C26
0.1
L6
27
TX MIX OUT
7T
C28
0.1
L1
27
C11
0.1
IN
TXIF2 (15 KHZ)
C22
0.1
C12
0.1
C10
0.1
2V
U3
SA612
TX Mixer
V+
V-
C20
0.1
C1
0.1
L2
27
5V
U1
MCP809T-450
R17 330
R18 750
C7
0.1
C19
0.1
Vss
Vdd
/RST
J3
Ext. Ref.
Z1
VC
5V
NC
GND
OUT
R14 330
R15
330
R10
150
R11
330
R12
150
R13
330
J1
Sub Ref.
J2
Main Ref.
100 HZ
VCTRL
5V
49.380
J4
Ext. Sync. Module
CUT
J4-6 to U2-9
Vcc
CLR
CLK
1D
2D
4D
3D
GND
1Q
2Q
4Q
3Q
U2
74VHC175
Divide by 6
R2
1K
R1
330
C4
0.1
Main RXLO2
J6
Sub RXLO2
J5
Elecraft KREF3 REF/2ND TX IF
By
W. Burdick
Rev.
XD
Date
3/3/07
Sht.
1 of 1

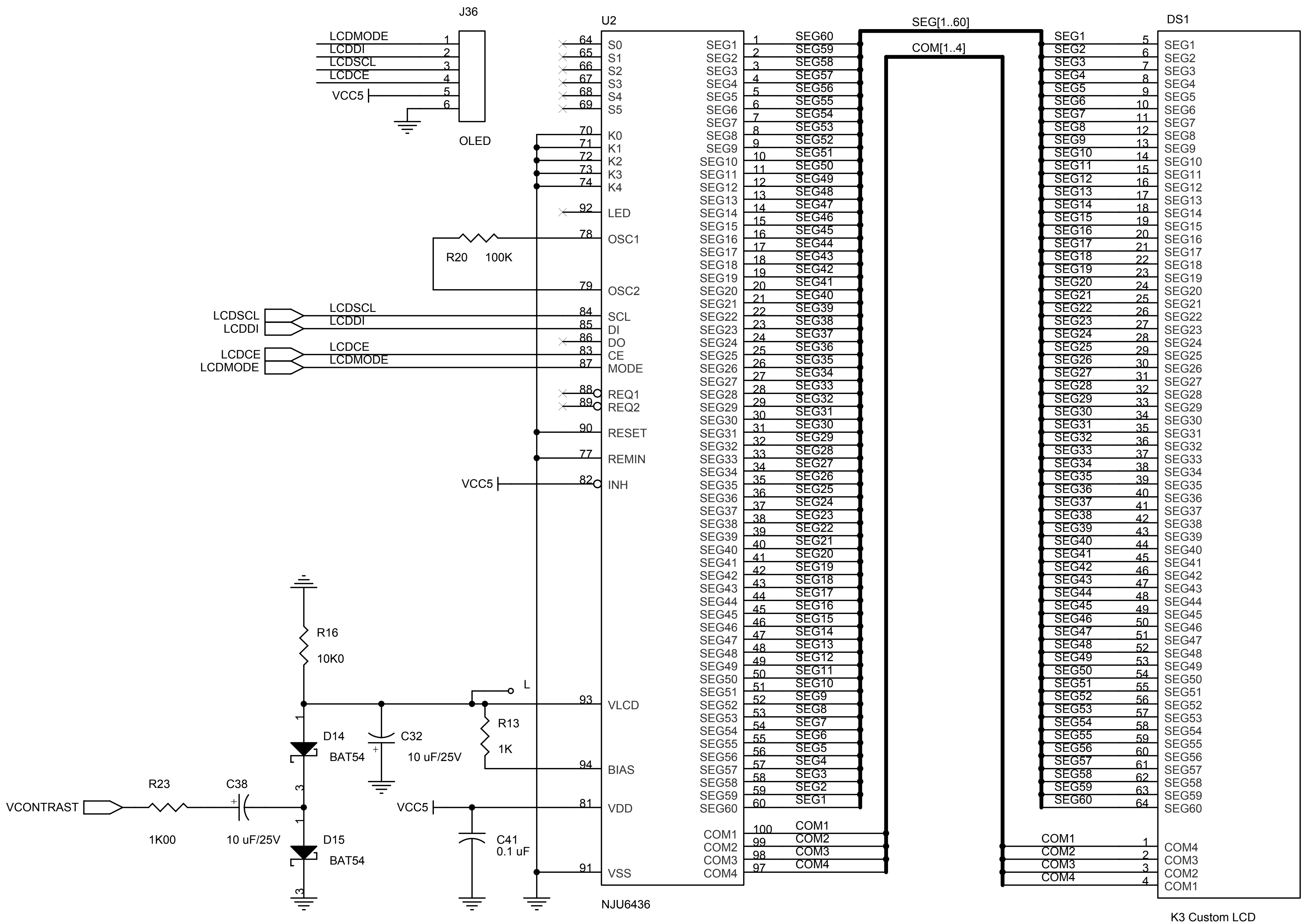

PLL
U3
ADF4001
U5A
OP284
U5B
Fpll = ~22 kHz
U1
TPIC6C595N
BAP64-04
MMBV109
VCO
8-46 MHz
ALC
Q1
J310
Q2
J310
Q5
2N3904
K2
L Select
(1.0 or 0.25 µH,
Pri: 9t #26, bifilar;
Sec: 3t #26)
B,D=Grn
A,C=Red
Crystal Filter
-6 dB @ +/- 1.2 kHz
Z = 500
Z = 200
DDS
U2
AD9834
J83
49.38 MHz
8.7-46 MHZ
R37
150
Leaded, 1/4 W
NOT ON REV A PCB
U6
ZXCL300E5
U7
74LCX125
U4
LMV321
+13 DBM
J84
VCO Out
Amp
+10 dB
Q3
2N3904
Q4
2N7002
Q6
2N3904
L6
50 µH
12T, FT37-43
R26
(not used)
Ⓚ = Keyed connector pin
* = Changes (from rev A3 to A4)
= On top side of PC board.
Elecraft
K3 Synthesizer
By
W. Burdick
Rev.
A4
Date
1-8-10
Sht.
1 of 1



NOTES: PCB Revision B

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Title	Elecraft K3: Front Panel	
Size A	Document Number 2004070601	Rev B,1
Date:	Tuesday, November 24, 2009	Sheet 1 of 7



PCB Revision B

U2 K[0..4] to use separable vias to ground for debug/development.

LCD pinout is Rev F.

R54 sets LCD driver current.

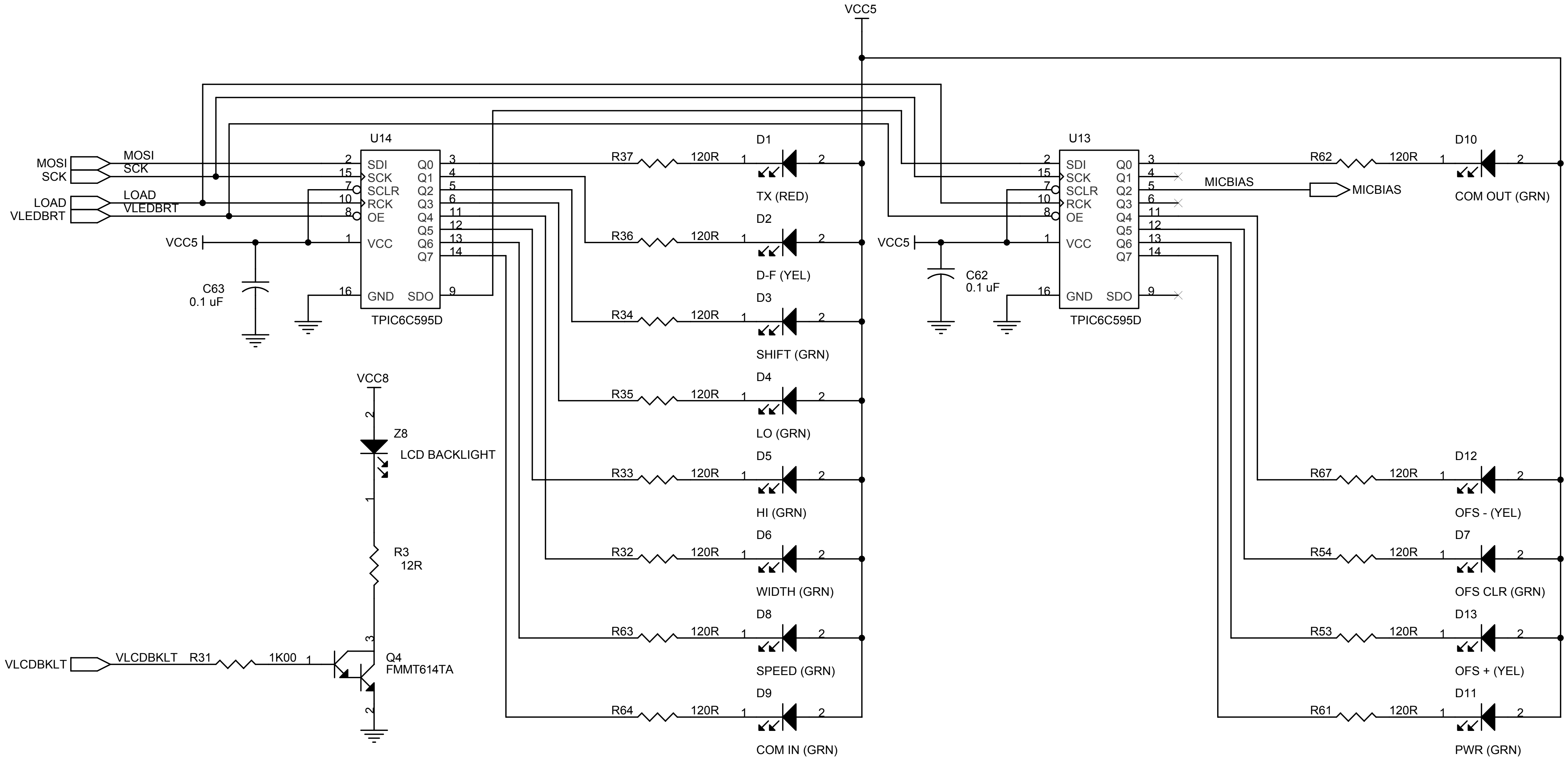
NOTES: R57 sets LCD drive frequency.

L Johnson

Title: Elecraft K3: Front Panel - LCD

Size	Document Number	Rev
B	2004070601	B.1

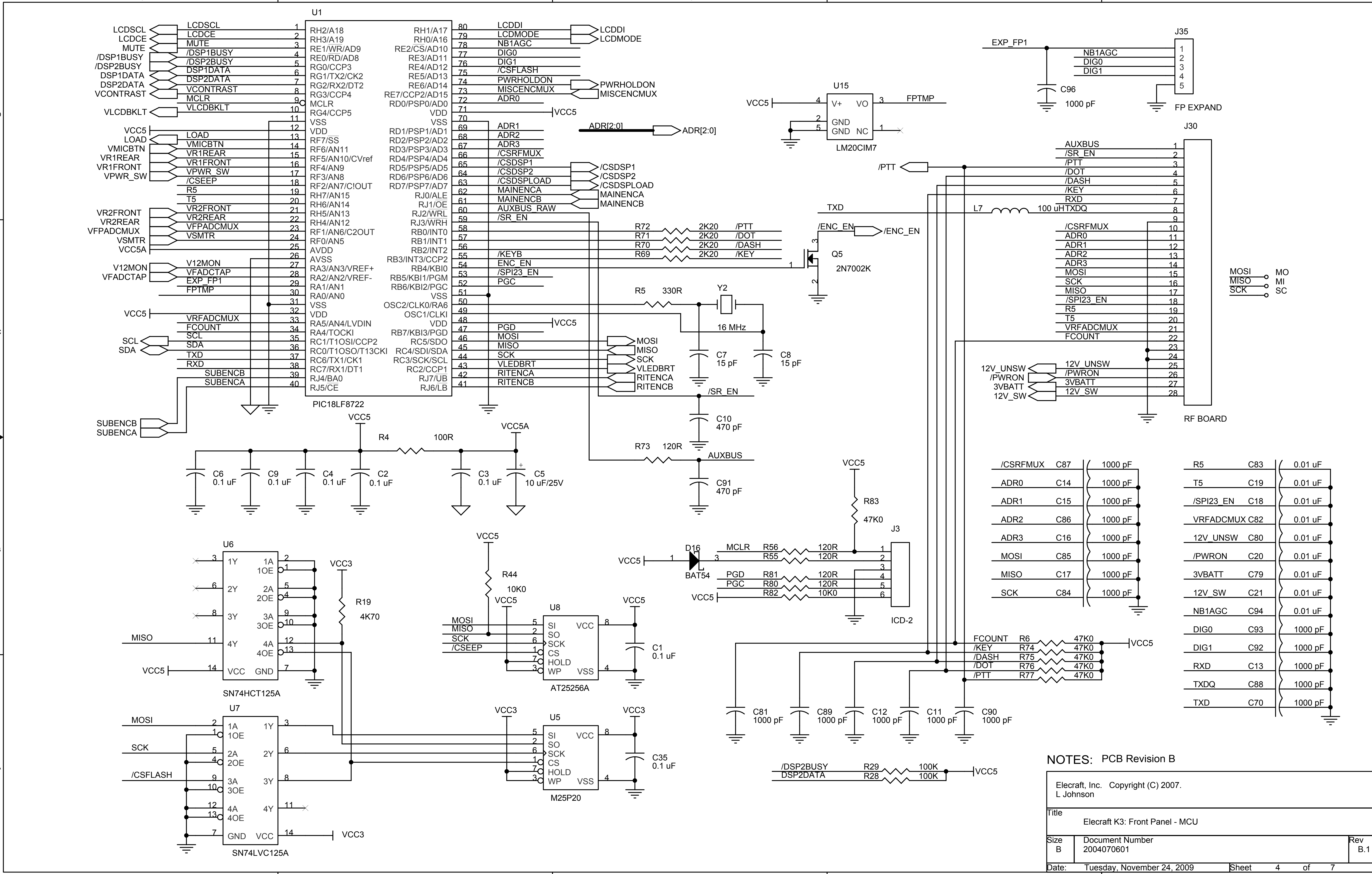
Date: Tuesday, November 24, 2009 Sheet 2 of 7



NOTES: PCB Revision B

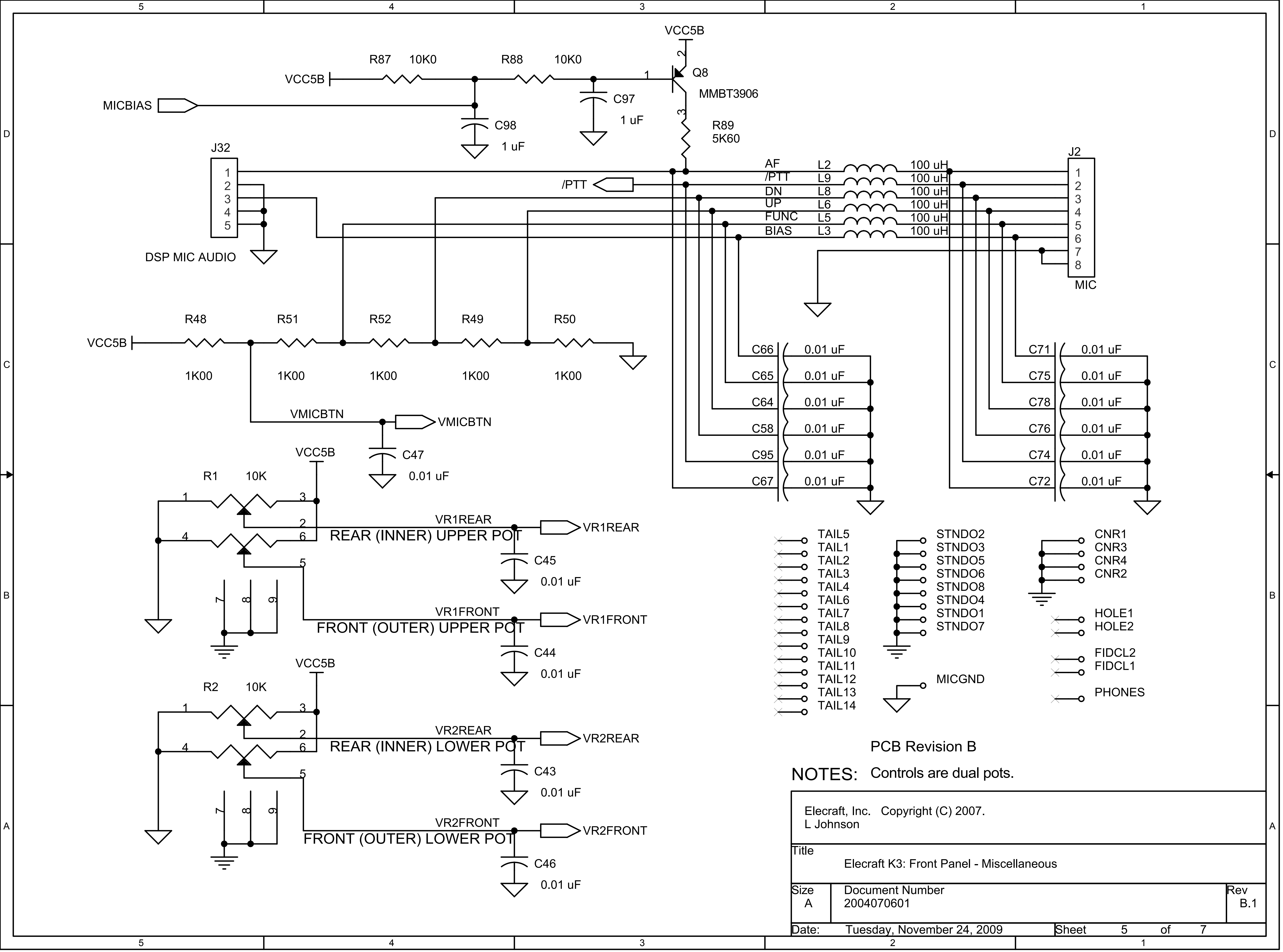
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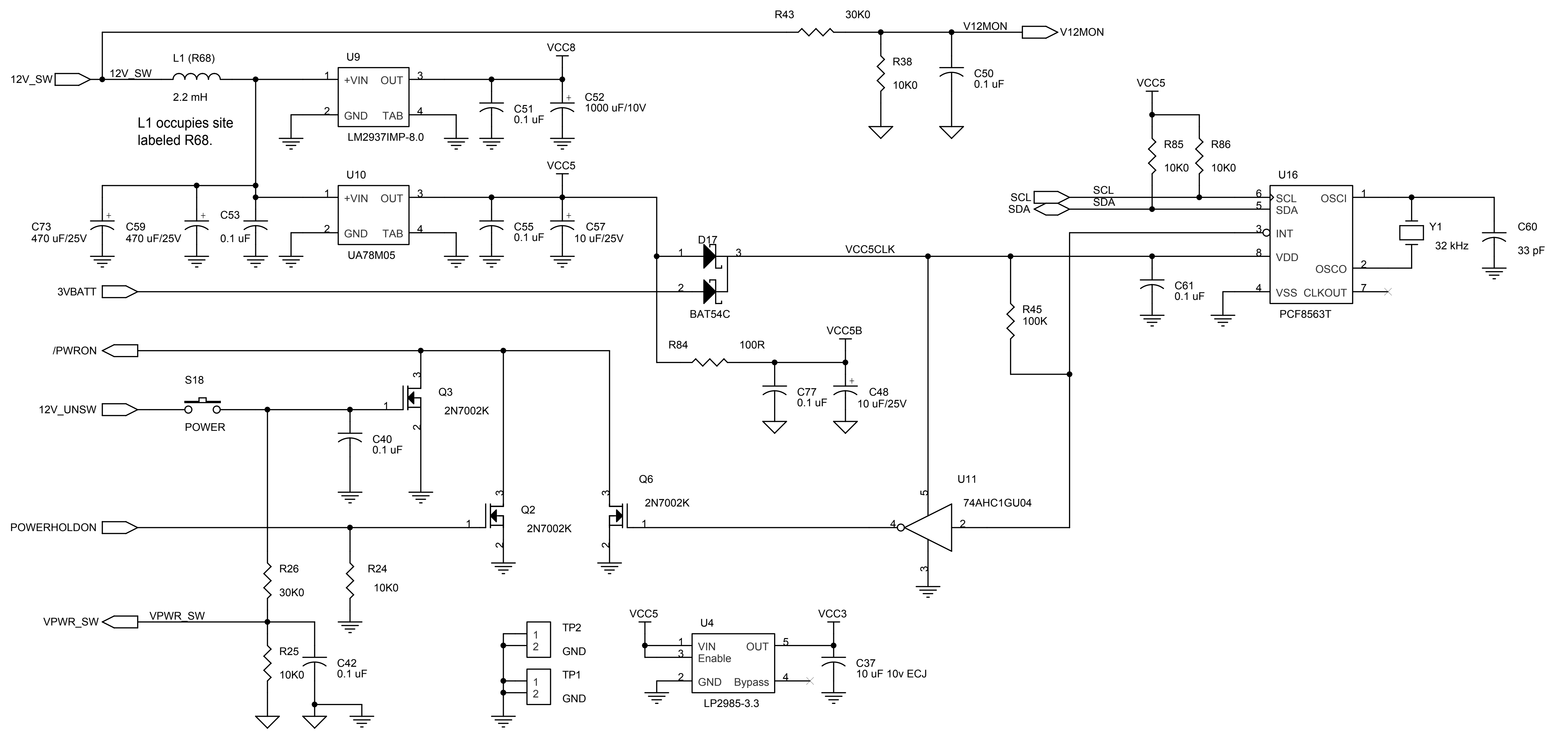
Title		
Elecraft K3: Front Panel - LEDs		
Size: B	Document Number: 2004070601	Rev: B.1
Date: Tuesday, November 24, 2009	Sheet 3 of 7	



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Title	Elecraft K3: Front Panel - MCU	
Size B	Document Number 2004070601	Rev B.1
Date: Tuesday, November 24, 2009	Sheet 4 of 7	


VCC5B
R87 10K0
R88 10K0
Q8
MMBT3906
MICBIAS
C98 1 uF
C97 1 uF
R89 5K60
J32
DSP MIC AUDIO
AF
/PTT
DN
UP
FUNC
BIAS
L2 100 uH
L9 100 uH
L8 100 uH
L6 100 uH
L5 100 uH
L3 100 uH
J2
MIC
R48 1K00
R51 1K00
R52 1K00
R49 1K00
R50 1K00
VMICBTN
C47 0.01 uF
C66 0.01 uF
C65 0.01 uF
C64 0.01 uF
C58 0.01 uF
C95 0.01 uF
C67 0.01 uF
C71 0.01 uF
C75 0.01 uF
C78 0.01 uF
C76 0.01 uF
C74 0.01 uF
C72 0.01 uF
R1 10K
VR1REAR
REAR (INNER) UPPER POT
C45 0.01 uF
VR1FRONT
FRONT (OUTER) UPPER POT
C44 0.01 uF
R2 10K
VR2REAR
REAR (INNER) LOWER POT
C43 0.01 uF
VR2FRONT
FRONT (OUTER) LOWER POT
C46 0.01 uF
TAIL5
TAIL1
TAIL2
TAIL3
TAIL4
TAIL6
TAIL7
TAIL8
TAIL9
TAIL10
TAIL11
TAIL12
TAIL13
TAIL14
STNDO2
STNDO3
STNDO5
STNDO6
STNDO8
STNDO4
STNDO1
STNDO7
MICGND
CNR1
CNR3
CNR4
CNR2
HOLE1
HOLE2
FIDCL2
FIDCL1
PHONES
PCB Revision B
NOTES: Controls are dual pots.
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Title
Elecraft K3: Front Panel - Miscellaneous
Size A
Document Number 2004070601
Rev B.1
Date: Tuesday, November 24, 2009
Sheet 5 of 7



PCB Revision B

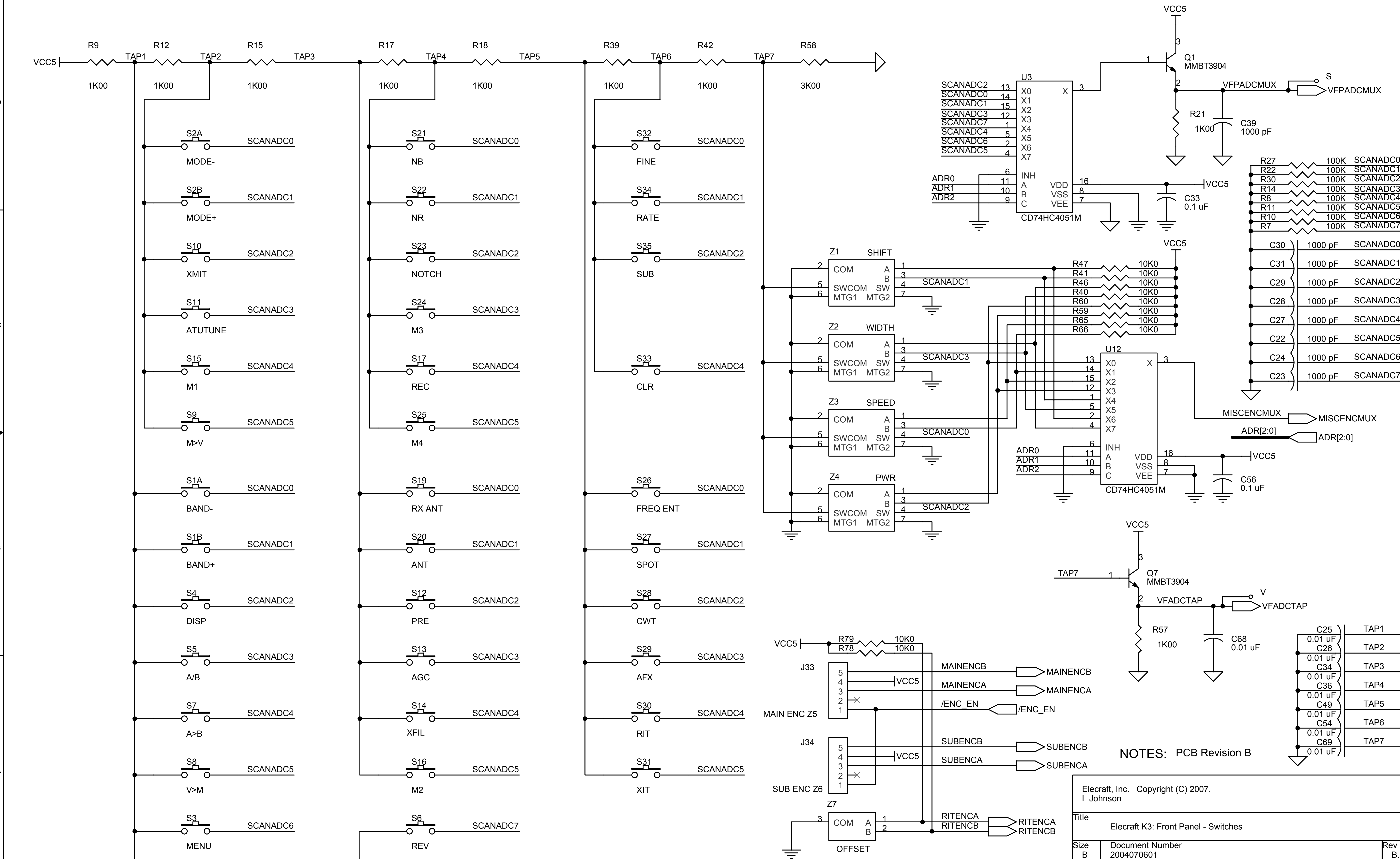
NOTES: Regulators U3 and U5 SOT-223.

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Title: Elecraft K3: Front Panel - Power and RTC

Size	Document Number	Rev
B	2004070601	B.1

Date: Tuesday, November 24, 2009 Sheet 6 of 7

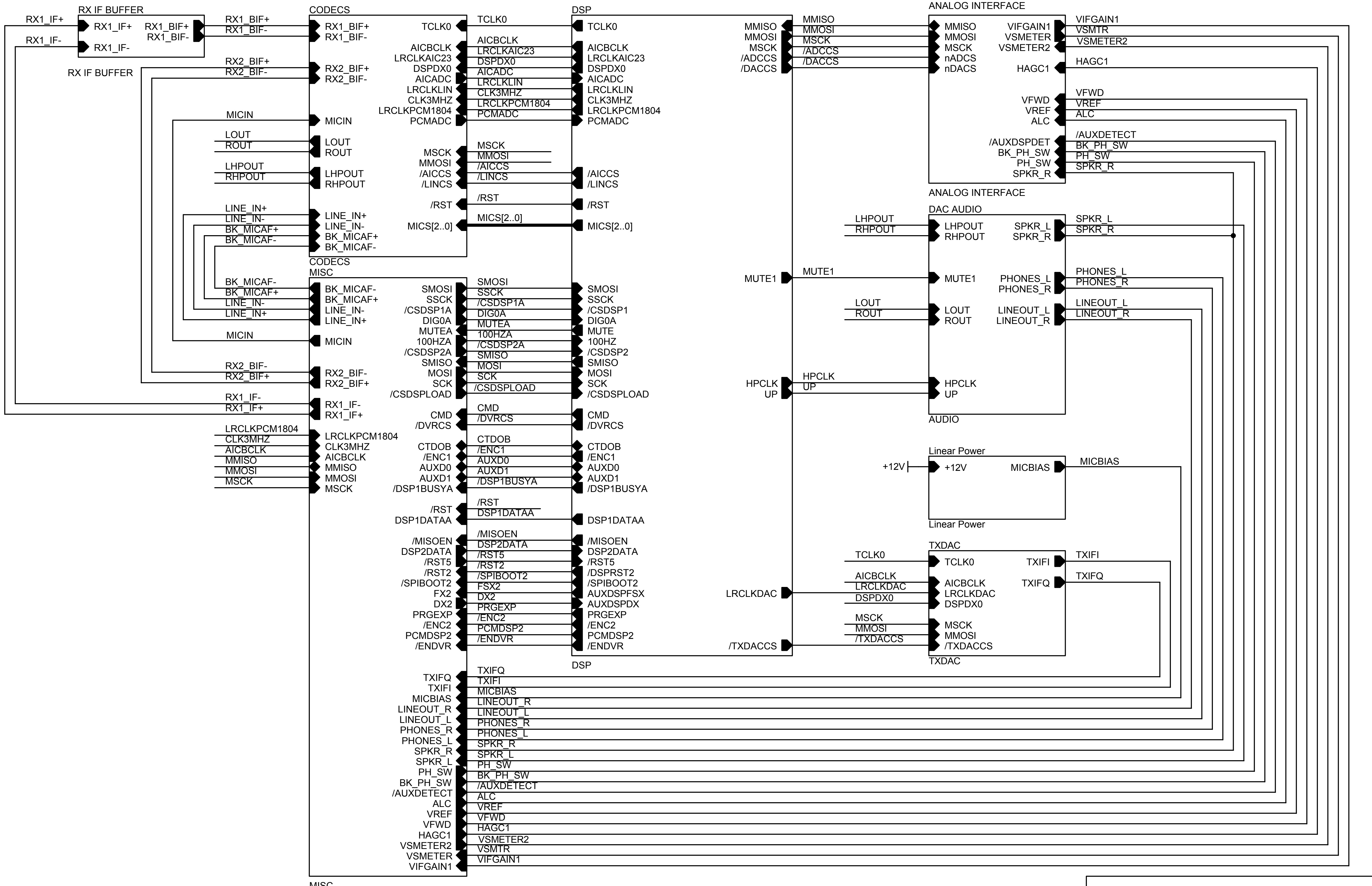


L Johnson

Title: Elecraft K3: Front Panel - Switches

Size	Document Number	Rev
B	2004070601	B.1

Date: Tuesday, November 24, 2009 Sheet 7 of 7



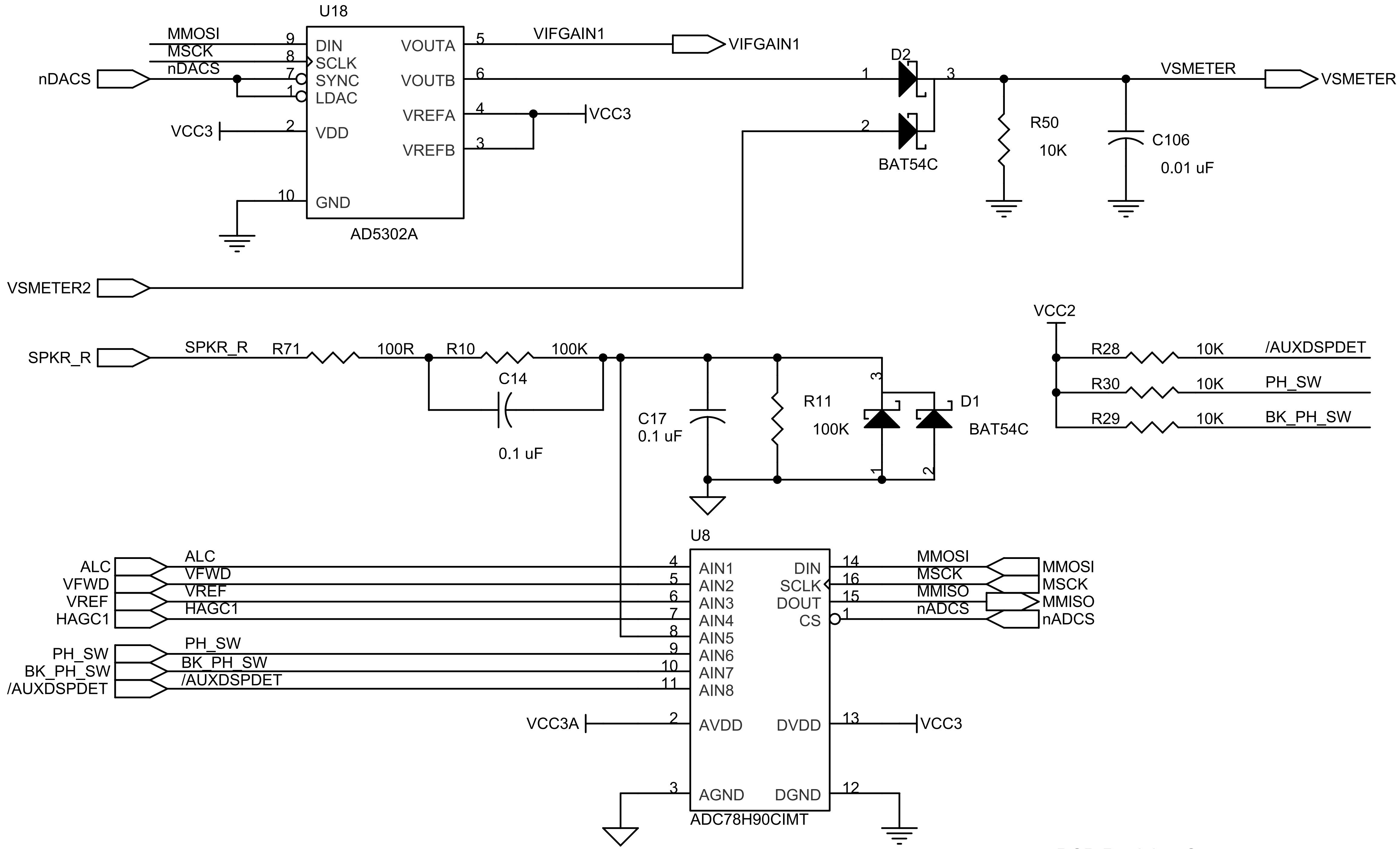
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Title: K3 DSP: Top Level

Size	Document Number	Rev
B	2004051101	C

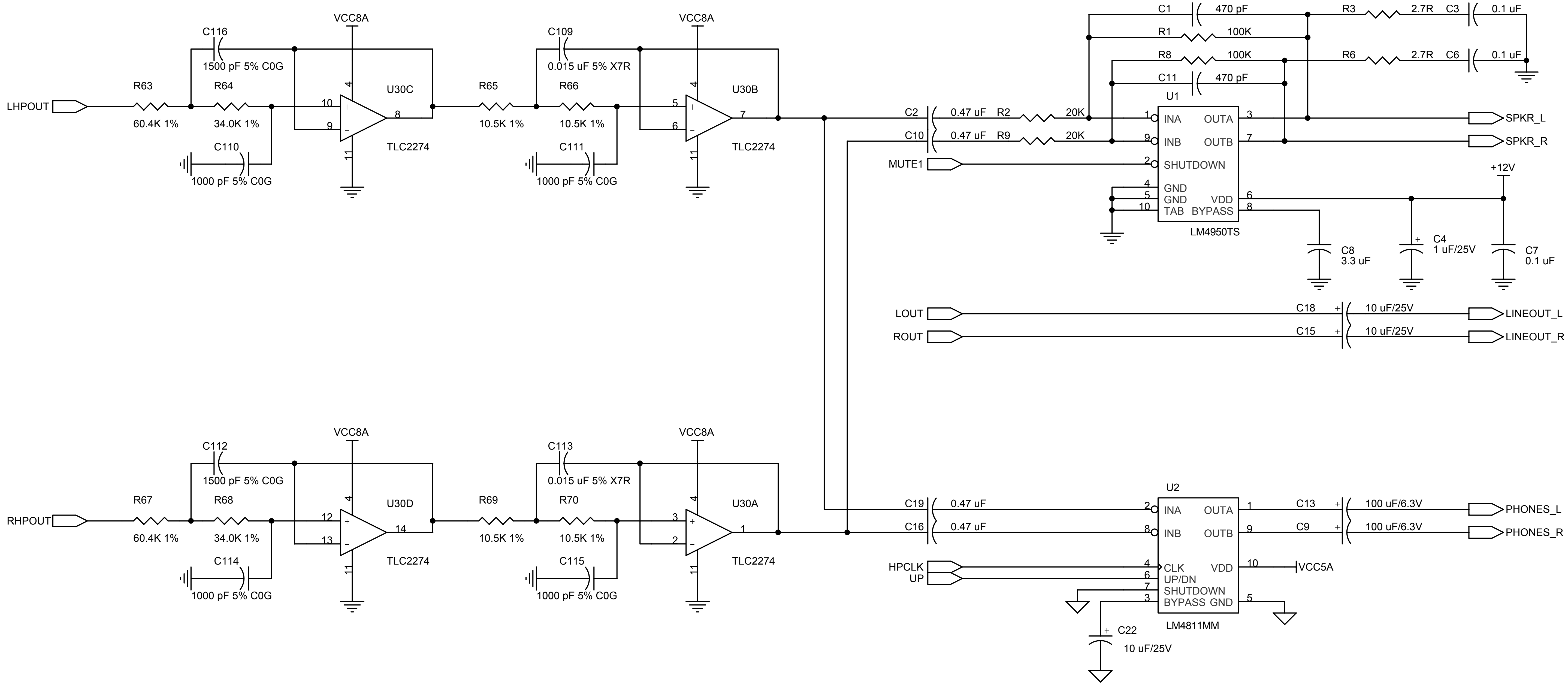
Date: Wednesday, June 16, 2010 — Sheet 1 of 9

NOTES: PCB Revision C



NOTES: PCB Revision C

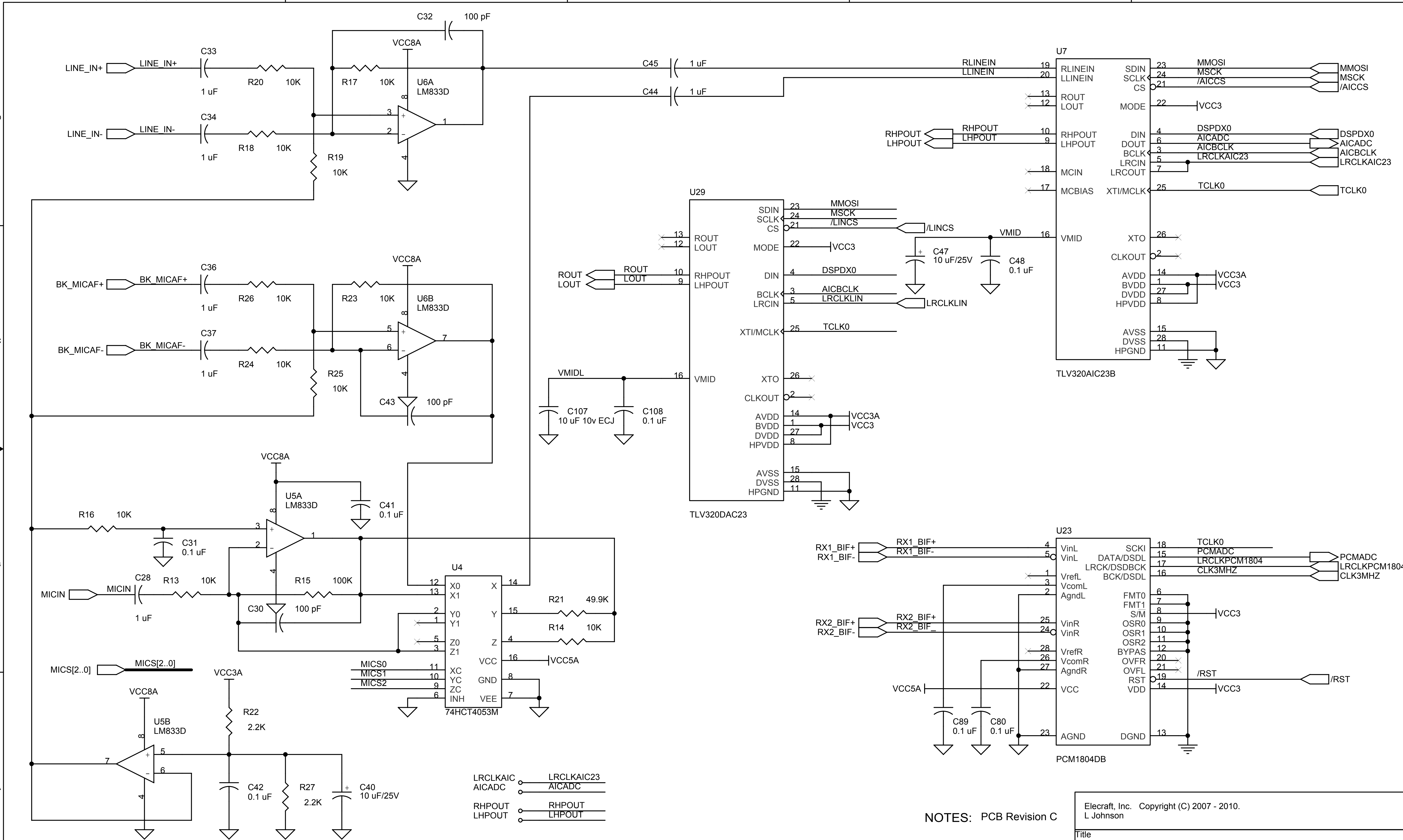
Elecraft, Inc. Copyright (C) 2007 - 2010. L Johnson		
Title K3 DSP: Analog Interface		
Size A	Document Number 2004051101	Rev C
Date: Wednesday, June 16, 2010	Sheet 2 of 9	



NOTES: PCB Revision C

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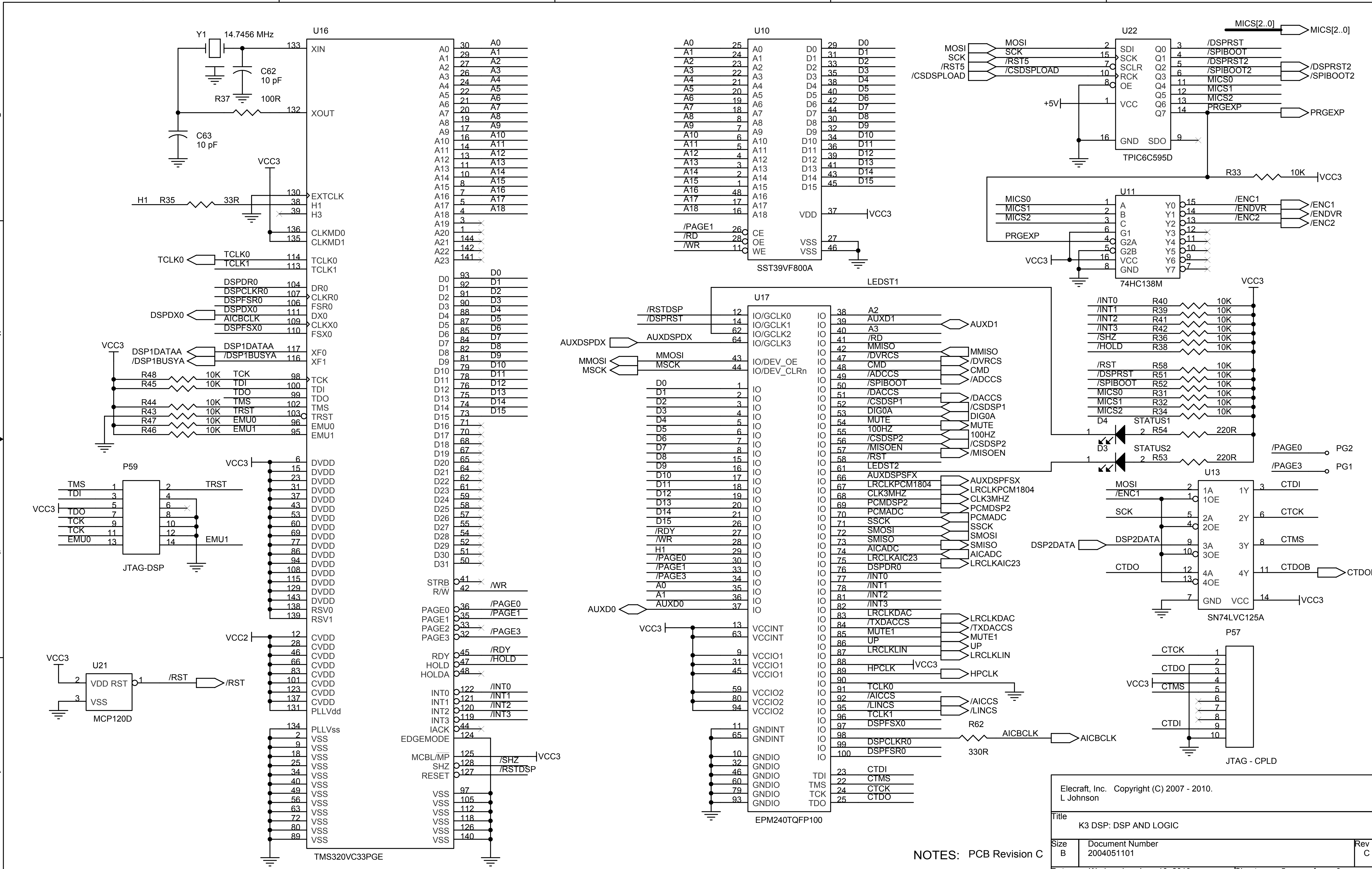
Title	K3 DSP: DAC Audio
Size	B
Document Number	2004051101
Rev	C
Date:	Wednesday, June 16, 2010
Sheet	3 of 9



NOTES: PCB Revision C

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Title	K3 DSP: CODECS	
Size B	Document Number 2004051101	Rev C
Date: Wednesday, June 16, 2010	Sheet 4 of 9	



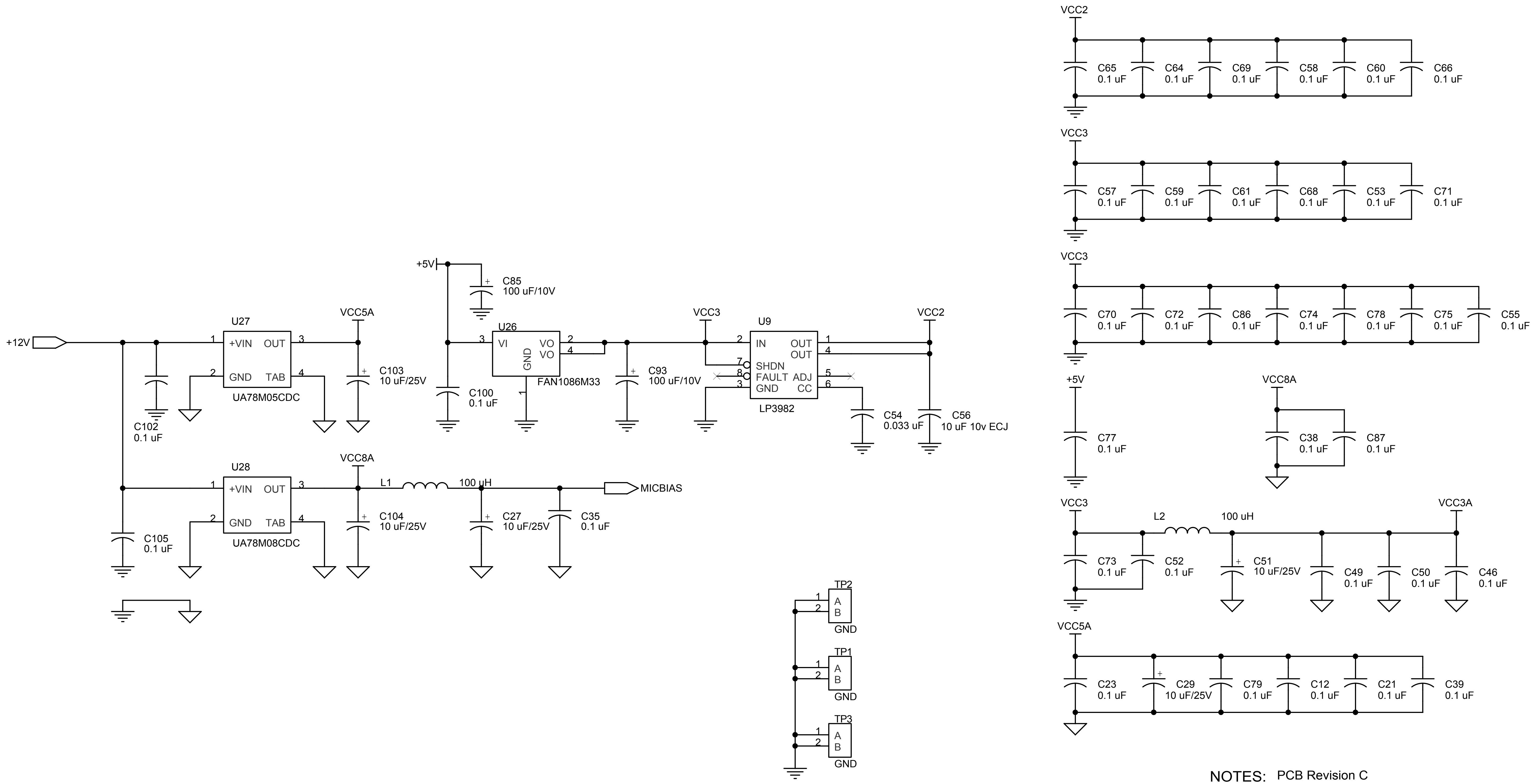
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Title: K3 DSP: DSP AND LOGIC

Size	Document Number	Rev
B	2004051101	C

Date: Wednesday, June 16, 2010 Sheet 5 of 9

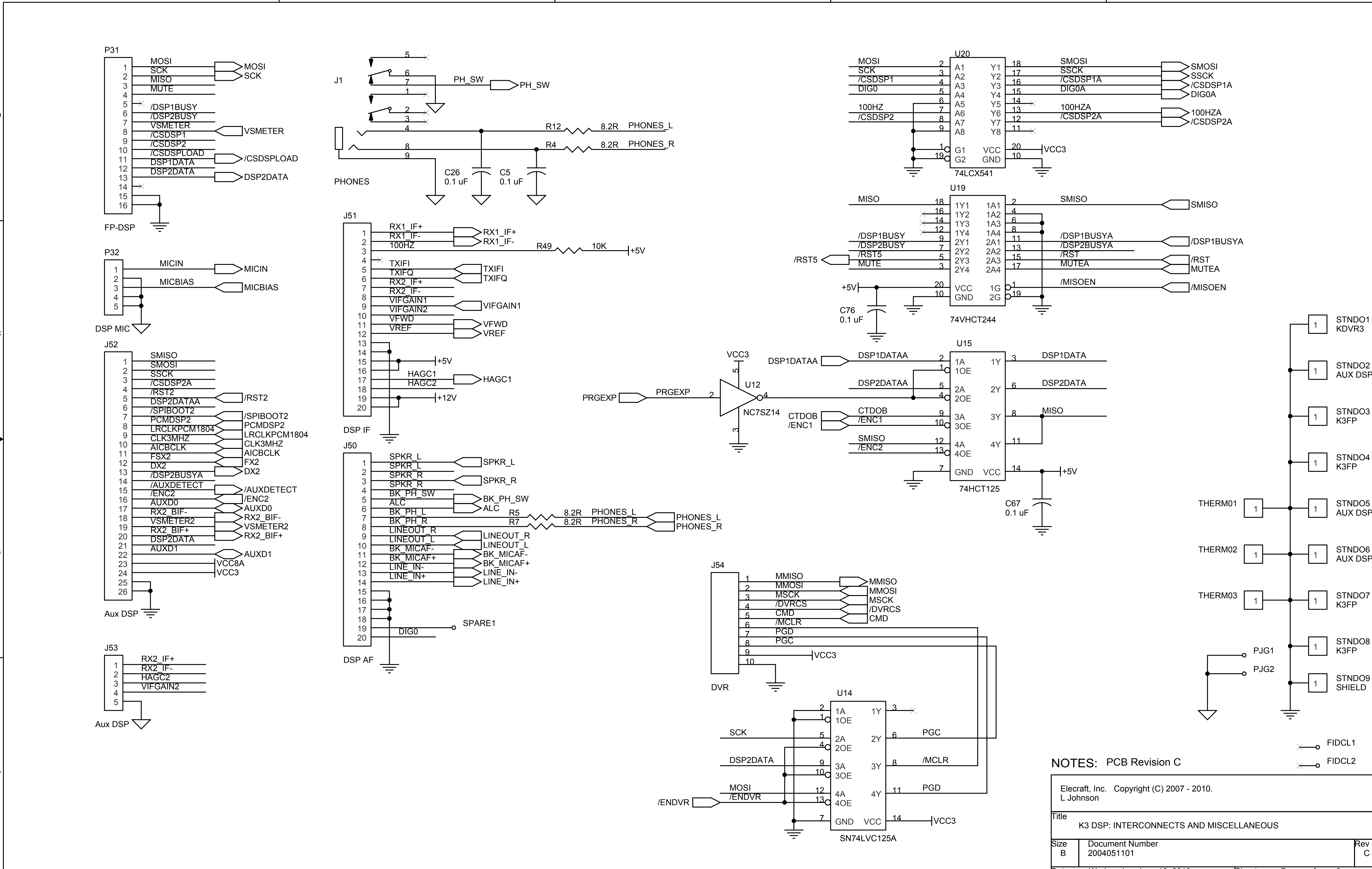
NOTES: PCB Revision C

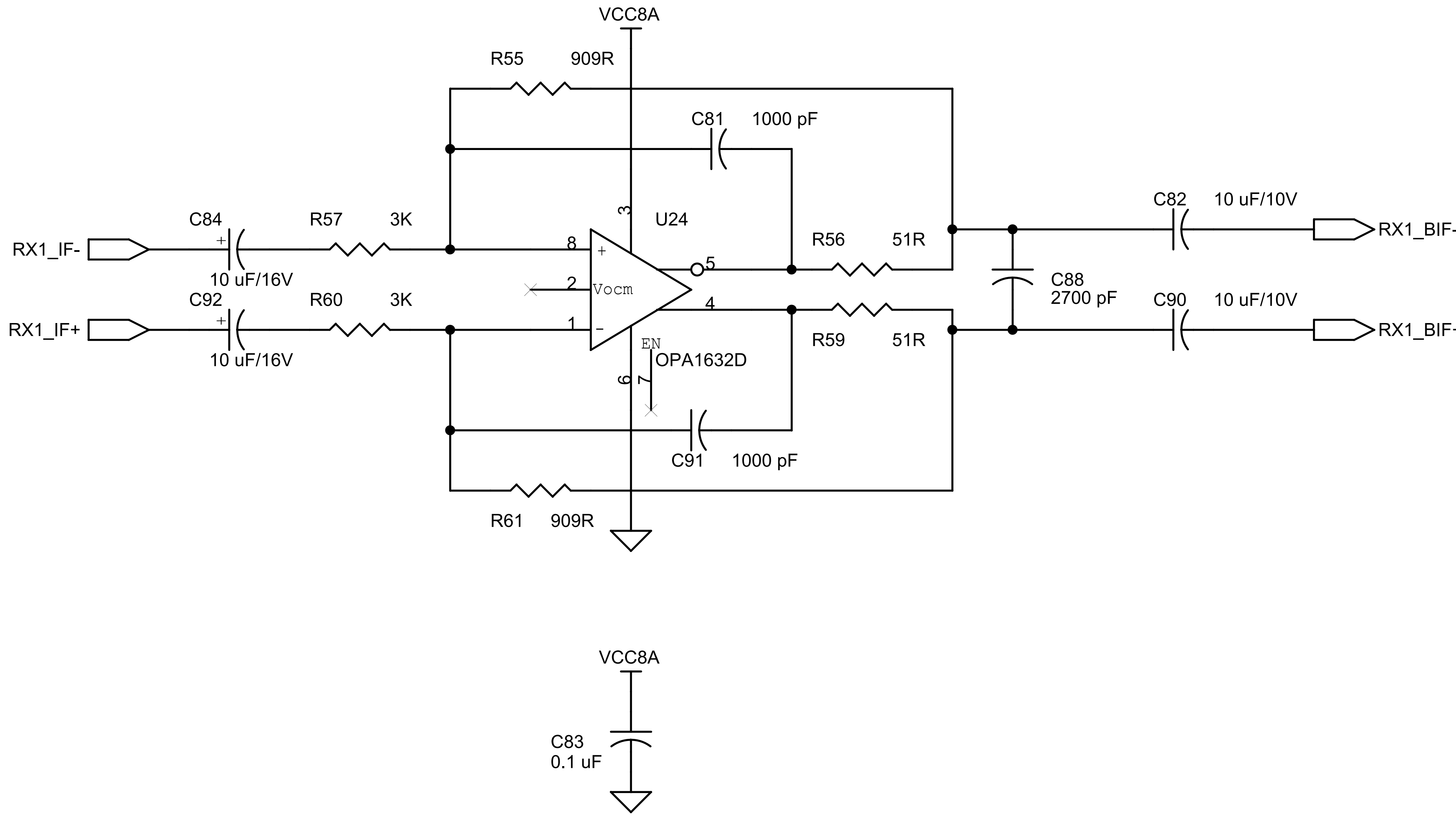


NOTES: PCB Revision C

L Johnson

Title	K3 DSP: Power Supply	
Size B	Document Number 2004051101	Rev C
Date: Wednesday, June 16, 2010	Sheet 6 of 9	

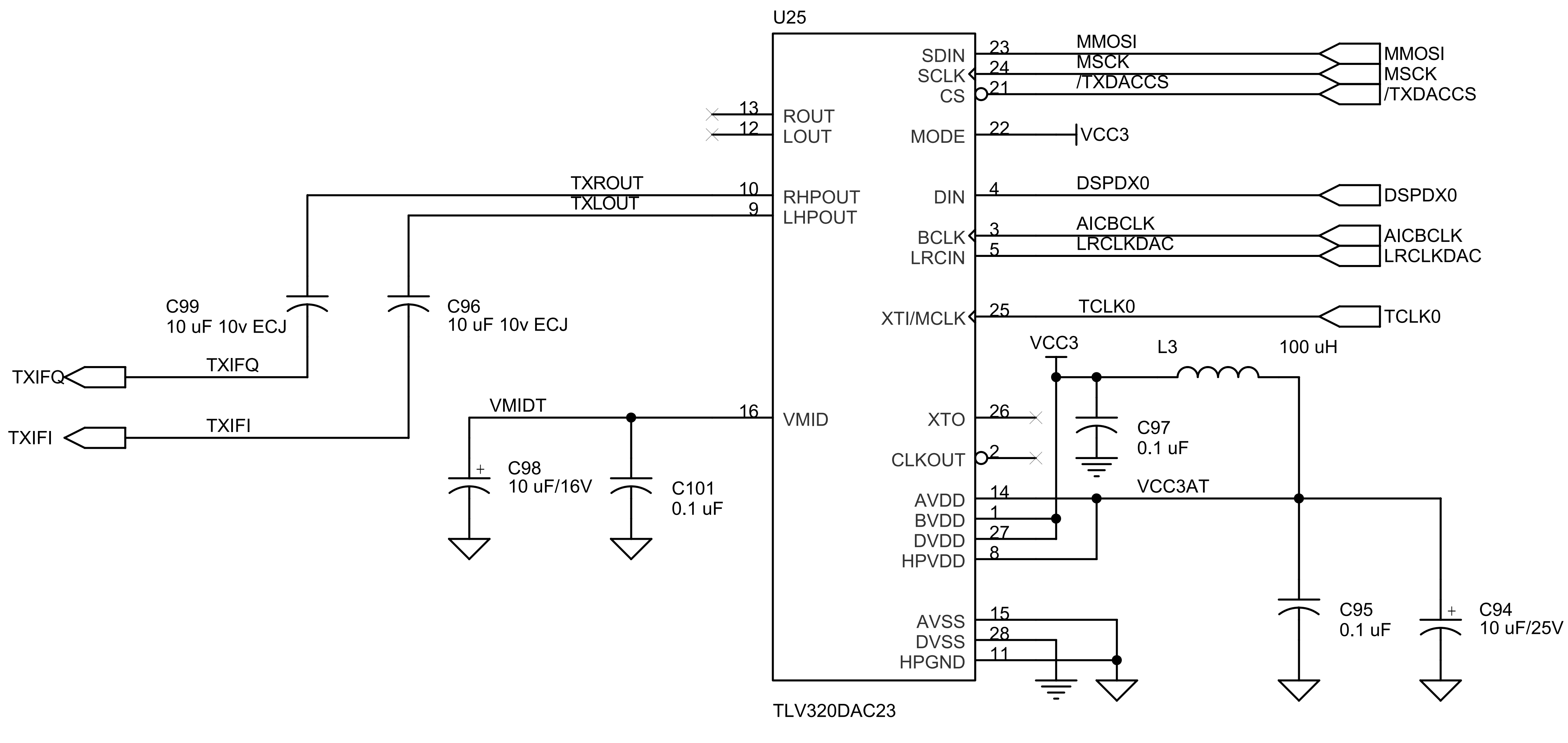

P31
FP-DSP
MOSI
SCK
MISO
MUTE
/DSP1BUSY
/DSP2BUSY
VSMETER
/CSDSP1
/CSDSP2
/CSDSPLOAD
DSP1DATA
DSP2DATA
P32
DSP MIC
MICIN
MICBIAS
J52
Aux DSP
SMISO
SMOSI
SSCK
/CSDSP2A
/RST2
DSP2DATAA
/SPIBOOT2
PCMDSP2
LRCLKPCM1804
CLK3MHZ
AICBCLK
FSX2
DX2
/DSP2BUSYA
/AUXDETECT
/ENC2
AUXD0
RX2_BIF-
VSMETER2
RX2_BIF+
AUXD1
VCC8A
VCC3
J53
Aux DSP
RX2_IF+
RX2_IF-
HAGC2
VIFGAIN2
J1
PHONES
PH_SW
R12 8.2R PHONES_L
R4 8.2R PHONES_R
C26 0.1 uF
C5 0.1 uF
J51
DSP IF
RX1_IF+
RX1_IF-
100HZ
R49 10K +5V
TXIFI
TXIFQ
RX2_IF+
RX2_IF-
VIFGAIN1
VIFGAIN2
VFWD
VREF
HAGC1
HAGC2
+5V
+12V
J50
DSP AF
SPKR_L
SPKR_R
BK_PH_SW
ALC
BK_PH_L
BK_PH_R
R5 8.2R PHONES_L
R7 8.2R PHONES_R
LINEOUT_R
LINEOUT_L
BK_MICAF-
BK_MICAF+
LINE_IN-
LINE_IN+
SPARE1
DIG0
U20
74LCX541
/CSDSP1
DIG0
100HZ
/CSDSP2
SMOSI
SSCK
/CSDSP1A
DIG0A
100HZA
/CSDSP2A
VCC3
U19
74VHCT244
MISO
SMISO
/DSP1BUSY
/DSP2BUSY
/RST5
MUTE
/DSP1BUSYA
/DSP2BUSYA
/RST
MUTEA
/MISOEN
+5V
C76 0.1 uF
VCC3
U12
NC7SZ14
PRGEXP
U15
74HCT125
DSP1DATAA
DSP2DATAA
CTDOB
/ENC1
SMISO
/ENC2
DSP1DATA
DSP2DATA
MISO
+5V
C67 0.1 uF
J54
DVR
MMISO
MMOSI
MSCK
/DVRCS
CMD
/MCLR
PGD
PGC
VCC3
U14
SN74LVC125A
SCK
DSP2DATA
MOSI
/ENDVR
PGC
/MCLR
PGD
VCC3
STNDO1 KDVR3
STNDO2 AUX DSP
STNDO3 K3FP
STNDO4 K3FP
STNDO5 AUX DSP
STNDO6 AUX DSP
STNDO7 K3FP
STNDO8 K3FP
STNDO9 SHIELD
THERM01
THERM02
THERM03
PJG1
PJG2
FIDCL1
FIDCL2
NOTES: PCB Revision C
Elecraft, Inc. Copyright (C) 2007 - 2010.
L Johnson
Title
K3 DSP: INTERCONNECTS AND MISCELLANEOUS
Size B
Document Number 2004051101
Rev C
Date: Wednesday, June 16, 2010
Sheet 7 of 9



NOTES: PCB Revision C

L Johnson

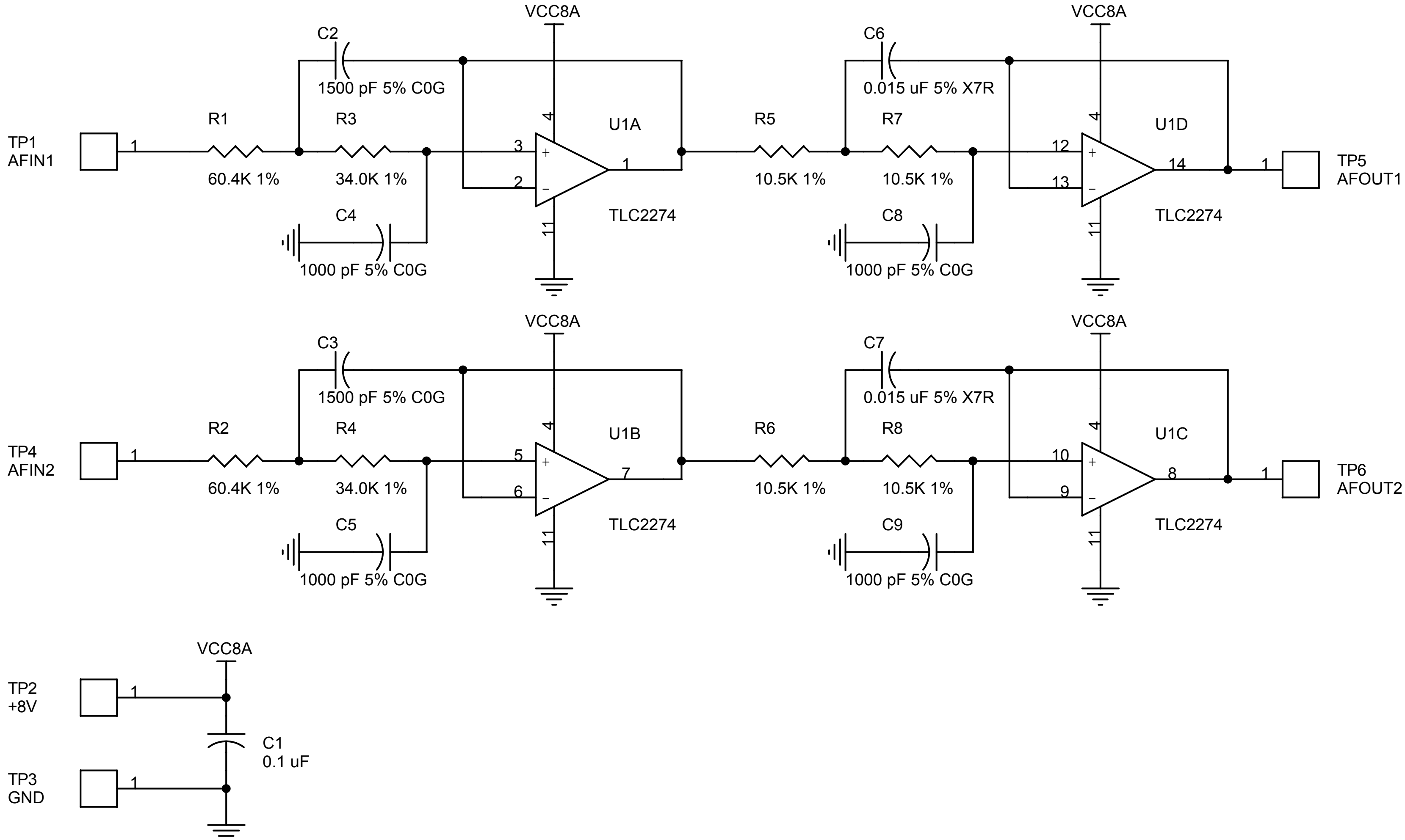
Title	K3 DSP: RX IF BUFFER	
Size A	Document Number 2004051101	Rev C
Date: Wednesday, June 16, 2010	Sheet 8 of 9	



NOTES: PCB Revision C

L Johnson

Title: K3 DSP: TX DAC		
Size: A	Document Number: 2004051101	Rev: C
Date: Wednesday, June 16, 2010	Sheet 9 of 9	

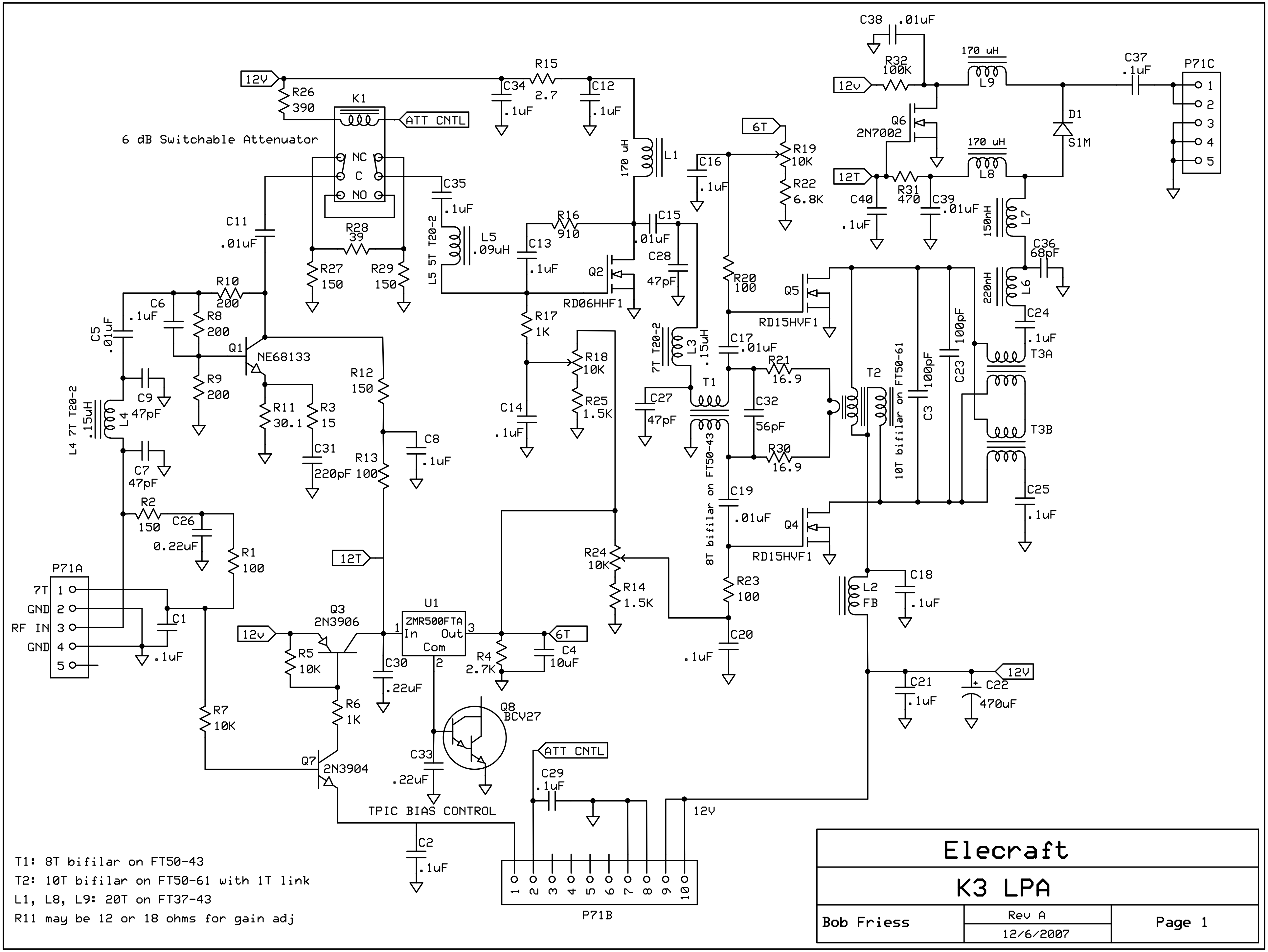


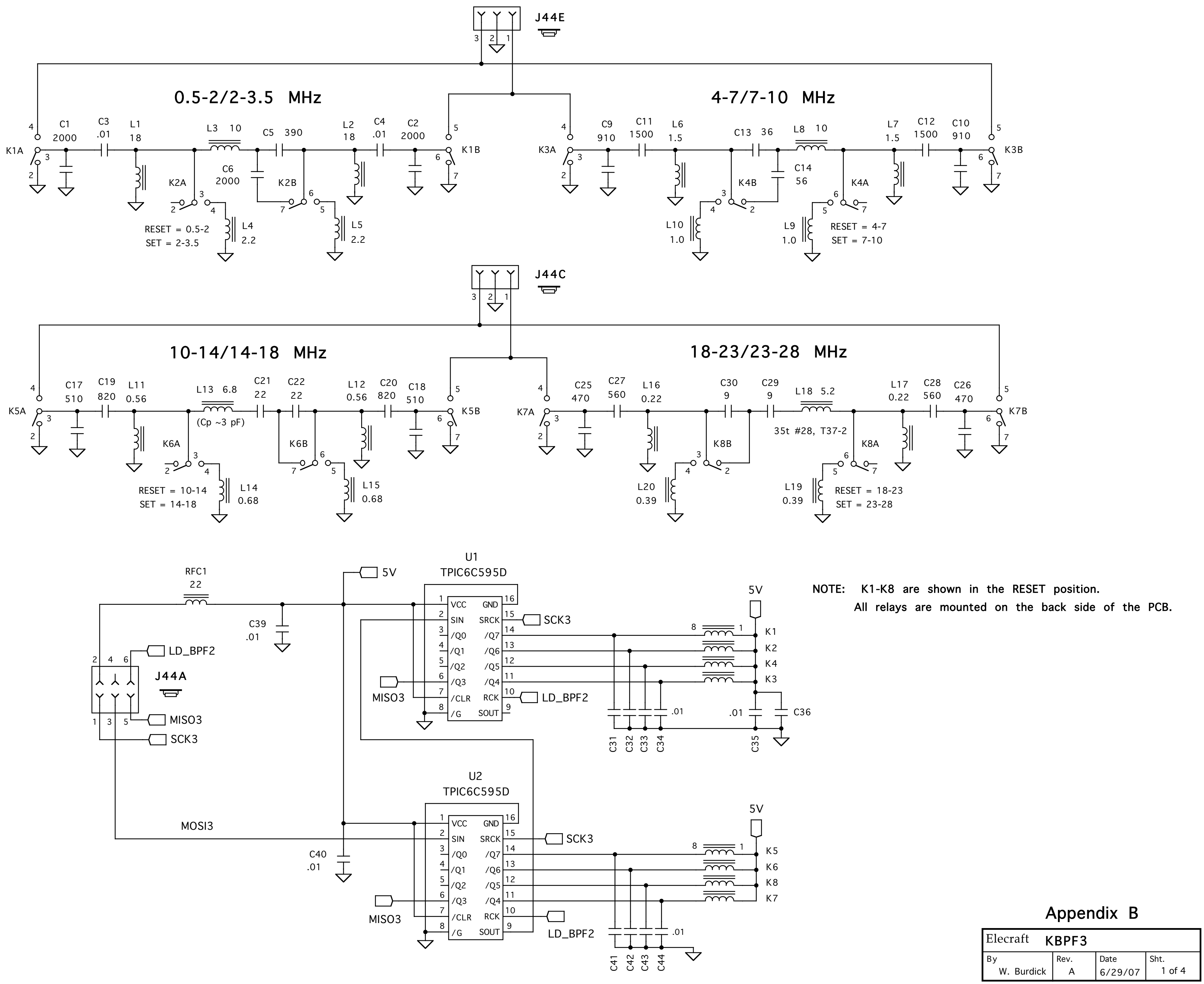
L Johnson

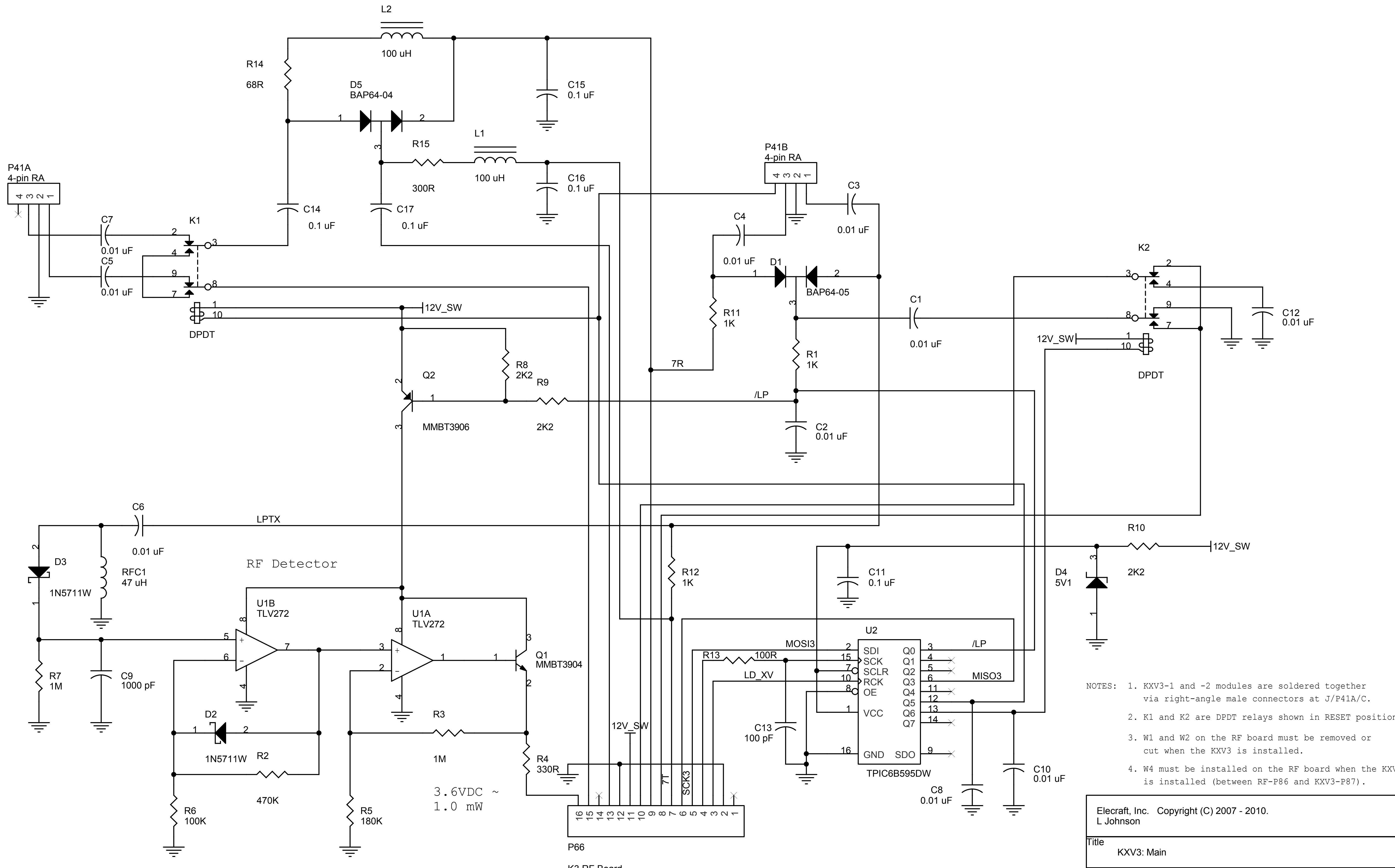
Title
K3: AF Filter

Size	Document Number	Rev
A	E2008090801	A

Date: Wednesday, June 16, 2010 Sheet 1 of 1


6 dB Switchable Attenuator
ATT CNTL
12V
12v
12T
6T
K1
NC
C
NO
R26 390
R15 2.7
C34 .1uF
C12 .1uF
L1 170 uH
R16 910
C15 .01uF
C28 47pF
Q2 RD06HHF1
C35 .1uF
L5 5T T20-2
L5 .09uH
C13 .1uF
R28 39
R27 150
R29 150
C11 .01uF
R10 200
C6 .1uF
R8 200
C5 .01uF
Q1 NE68133
R9 200
R11 30.1
R3 15
C31 220pF
R12 150
R13 100
C8 .1uF
L4 7T T20-2
L4 .15uH
C9 47pF
C7 47pF
R2 150
C26 0.22uF
R1 100
P71A
7T 1
GND 2
RF IN 3
GND 4
5
C1 .1uF
R7 10K
Q3 2N3906
R5 10K
R6 1K
Q7 2N3904
TPIC BIAS CONTROL
C2 .1uF
U1 ZMR500FTA
In Out Com
C30 .22uF
C33 .22uF
Q8 BCV27
R4 2.7K
C4 10uF
R17 1K
R18 10K
R25 1.5K
C14 .1uF
R24 10K
R14 1.5K
C29 .1uF
12V
P71B
C16 .1uF
R19 10K
R22 6.8K
L3 7T T20-2
L3 .15uH
C27 47pF
T1
8T bifilar on FT50-43
C17 .01uF
R21 16.9
C32 56pF
R30 16.9
C19 .01uF
R20 100
R23 100
C20 .1uF
Q5 RD15HVF1
Q4 RD15HVF1
T2
10T bifilar on FT50-61
C3 100pF
C23 100pF
L2 FB
C18 .1uF
C21 .1uF
C22 470uF
C38 .01uF
R32 100K
L9 170 uH
C37 .1uF
P71C
D1 S1M
Q6 2N7002
R31 470
L8 170 uH
C40 .1uF
C39 .01uF
L7 150nH
C36 68pF
L6 220nH
C24 .1uF
T3A
T3B
C25 .1uF
T1: 8T bifilar on FT50-43
T2: 10T bifilar on FT50-61 with 1T link
L1, L8, L9: 20T on FT37-43
R11 may be 12 or 18 ohms for gain adj
Elecraft
K3 LPA
Bob Friess
Rev A
12/6/2007
Page 1

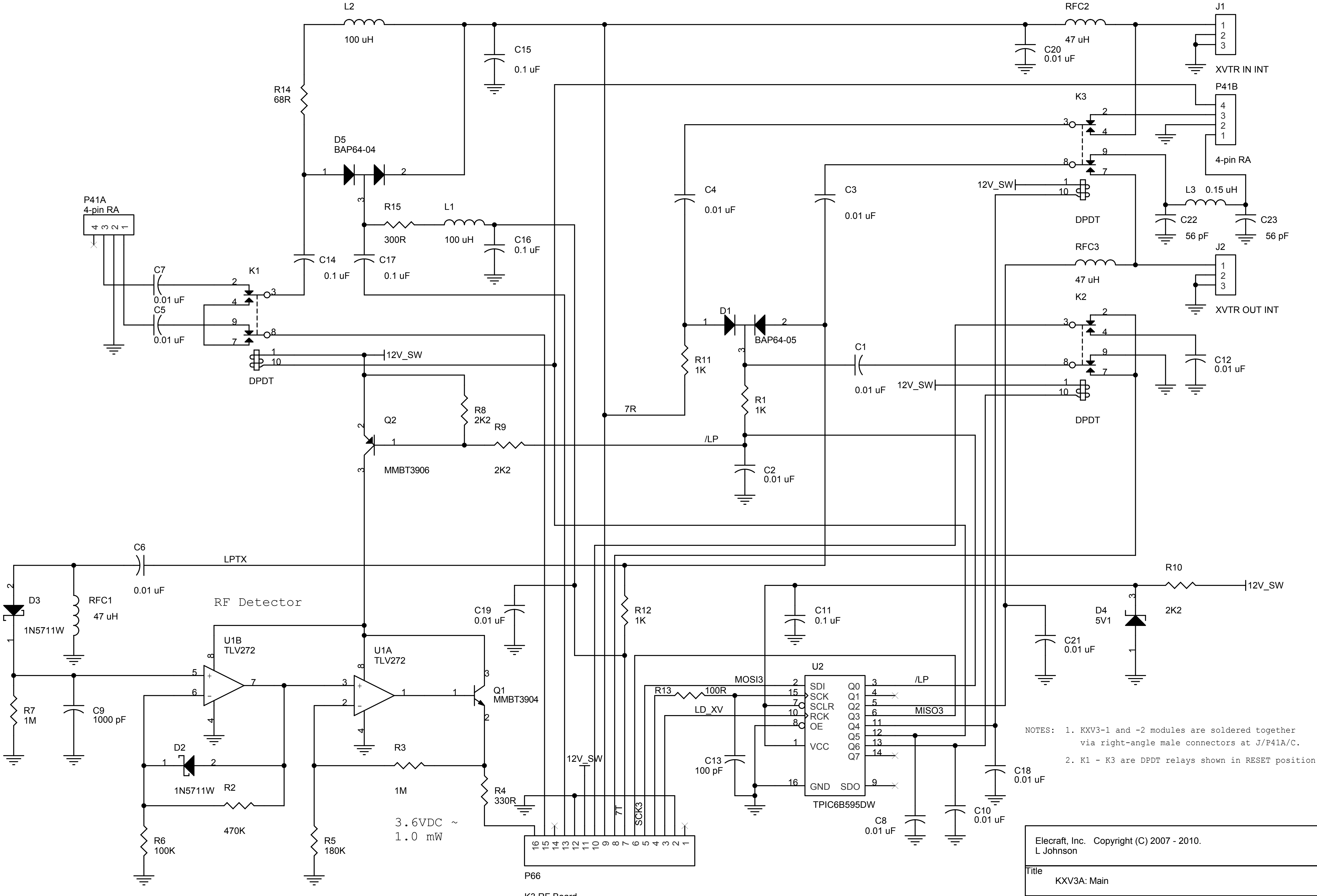

J44E
0.5-2/2-3.5 MHz
4-7/7-10 MHz
K1A K1B K2A K2B K3A K3B K4A K4B
C1 2000
C3 .01
L1 18
L3 10
C5 390
C6 2000
L2 18
C4 .01
C2 2000
L4 2.2
L5 2.2
RESET = 0.5-2
SET = 2-3.5
C9 910
C11 1500
L6 1.5
C13 36
L8 10
C14 56
L7 1.5
C12 1500
C10 910
L10 1.0
L9 1.0
RESET = 4-7
SET = 7-10
J44C
10-14/14-18 MHz
18-23/23-28 MHz
K5A K5B K6A K6B K7A K7B K8A K8B
C17 510
C19 820
L11 0.56
L13 6.8
(Cp ~3 pF)
C21 22
C22 22
L12 0.56
C20 820
C18 510
L14 0.68
L15 0.68
RESET = 10-14
SET = 14-18
C25 470
C27 560
L16 0.22
C30 9
C29 9
L18 5.2
35t #28, T37-2
L17 0.22
C28 560
C26 470
L20 0.39
L19 0.39
RESET = 18-23
SET = 23-28
RFC1 22
C39 .01
5V
U1 TPIC6C595D
U2 TPIC6C595D
VCC GND SIN SRCK /Q0 /Q1 /Q2 /Q3 /Q4 /Q5 /Q6 /Q7 /CLR RCK /G SOUT
J44A
LD_BPF2
MISO3
SCK3
MOSI3
C40 .01
K1 K2 K4 K3
K5 K6 K8 K7
C31 C32 C33 C34 .01
C35 .01 C36
C41 C42 C43 C44 .01
NOTE: K1-K8 are shown in the RESET position.
All relays are mounted on the back side of the PCB.
Appendix B
Elecraft KBPF3
By W. Burdick
Rev. A
Date 6/29/07
Sht. 1 of 4



NOTES:
1. KXV3-1 and -2 modules are soldered together via right-angle male connectors at J/P41A/C.
2. K1 and K2 are DPDT relays shown in RESET position.
3. W1 and W2 on the RF board must be removed or cut when the KXV3 is installed.
4. W4 must be installed on the RF board when the KXV3 is installed (between RF-P86 and KXV3-P87).

L Johnson

Title	KXV3: Main
Size	B
Document Number	2006030602
Rev	B1
Date:	Wednesday, June 16, 2010
Sheet	1 of 1

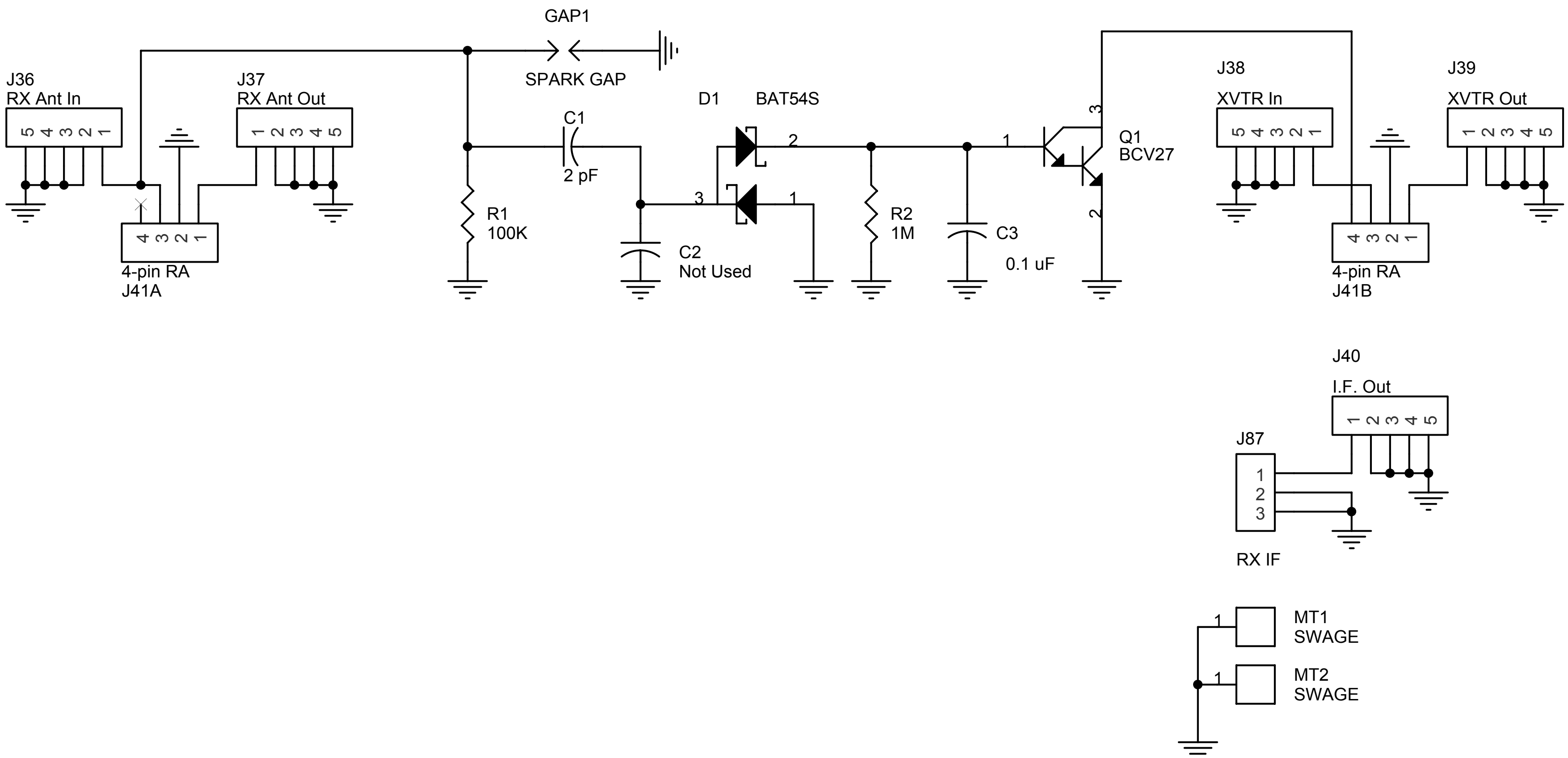


NOTES: 1. KXV3-1 and -2 modules are soldered together via right-angle male connectors at J/P41A/C.

2. K1 - K3 are DPDT relays shown in RESET position.

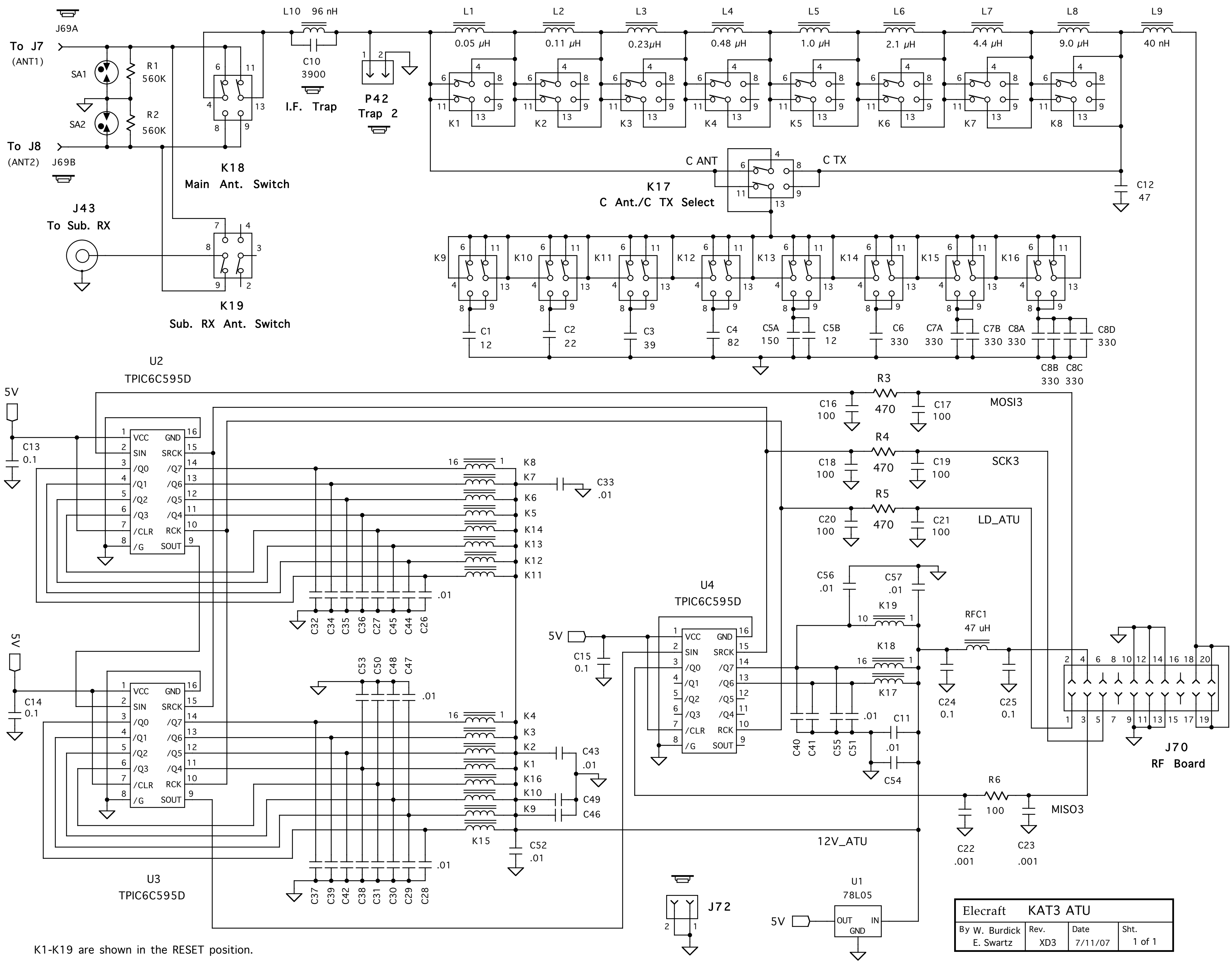
L Johnson

Title	KXV3A: Main	
Size B	Document Number 2006030602	Rev D
Date: Wednesday, June 16, 2010	Sheet 1 of 1	



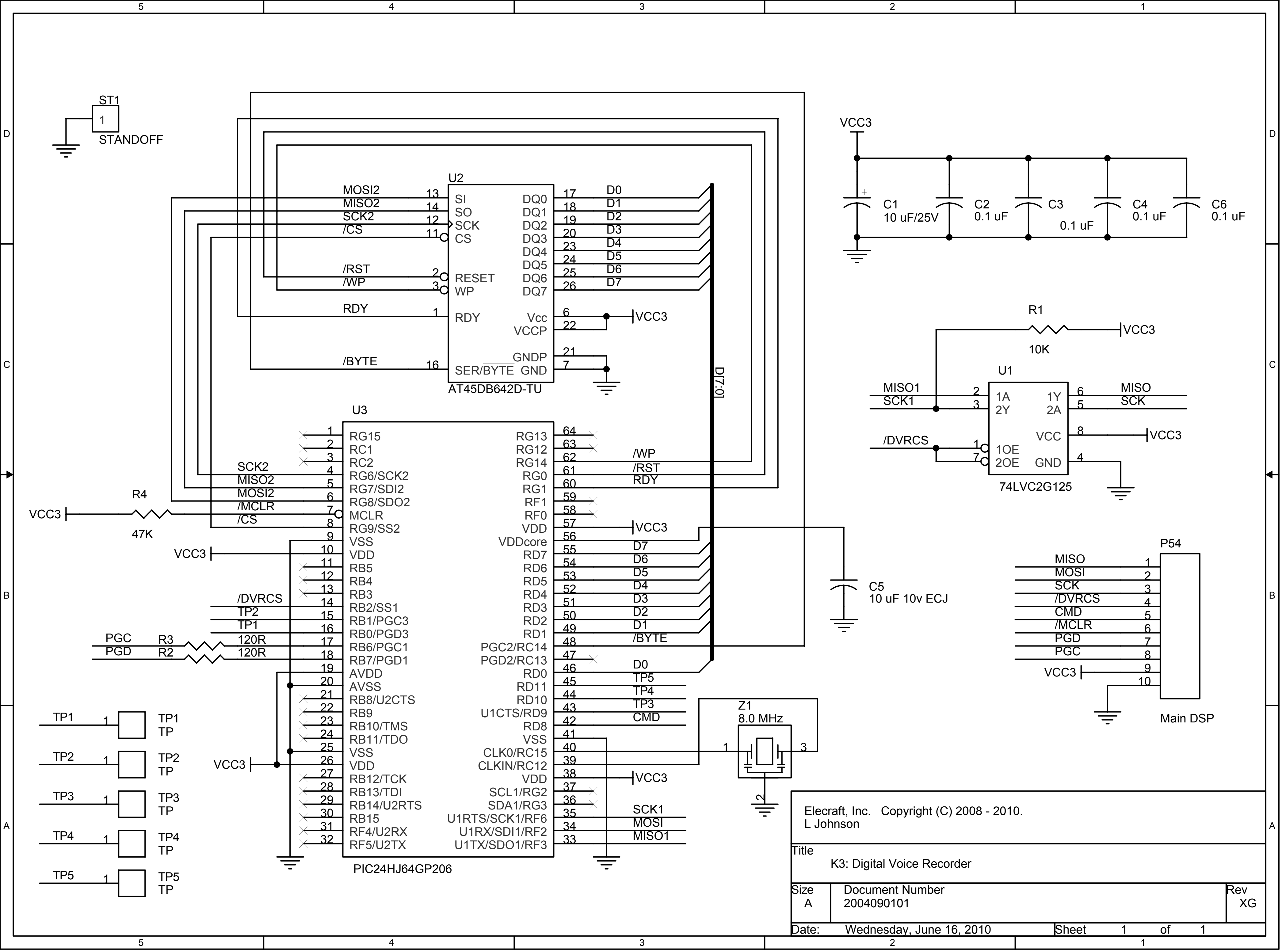
L Johnson

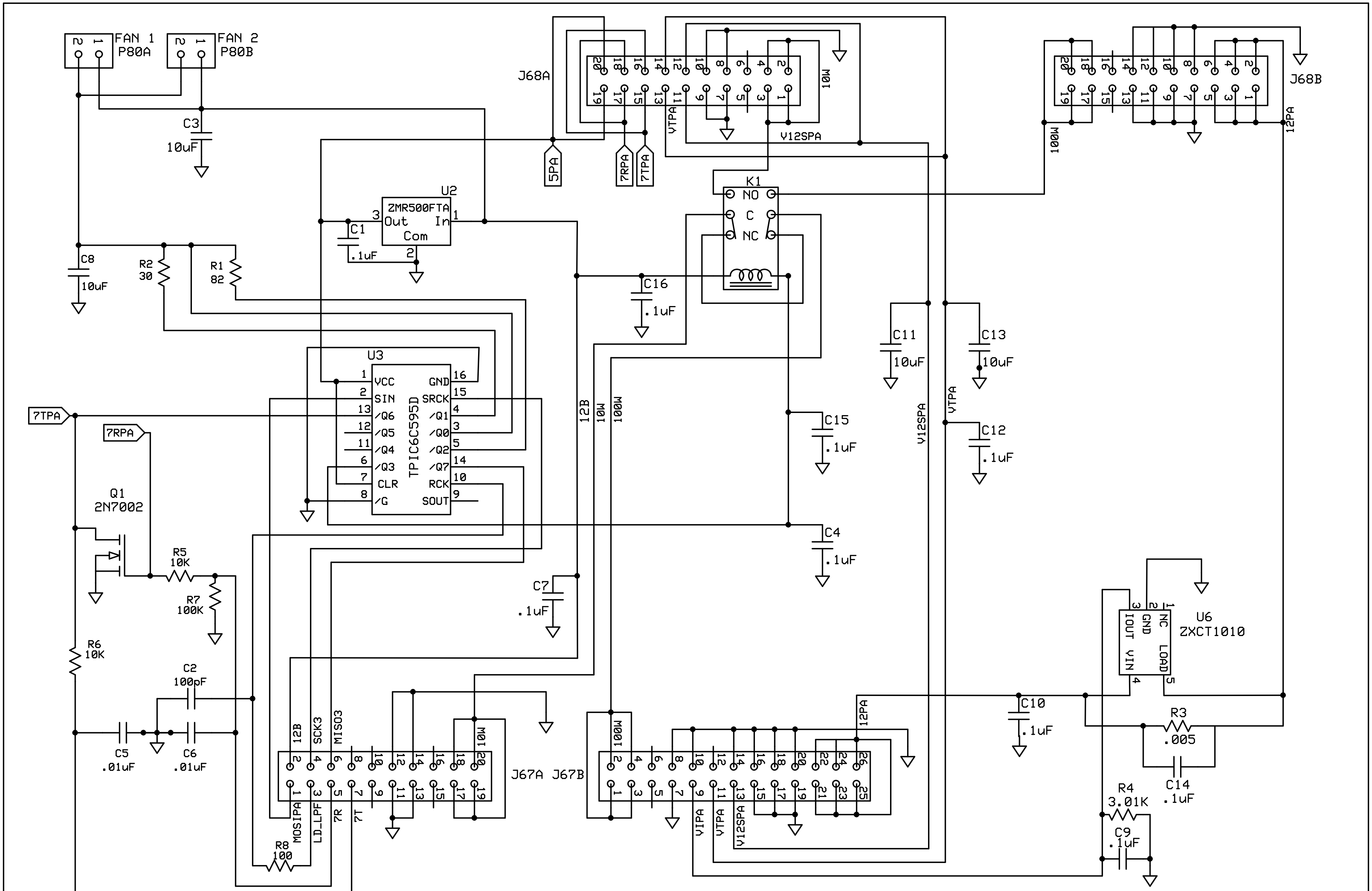
Title	KXV3: Connector	
Size: A	Document Number: 2006030602	Rev: A1
Date: Wednesday, June 16, 2010	Sheet 1 of 1	



K1-K19 are shown in the RESET position.

= Parts mounted on the bottom of the PC board. In addition to these, all relays are on the bottom.


ST1
STANDOFF
U2
AT45DB642D-TU
MOSI2 13 SI
MISO2 14 SO
SCK2 12 SCK
/CS 11 CS
/RST 2 RESET
/WP 3 WP
RDY 1 RDY
/BYTE 16 SER/BYTE
17 DQ0 D0
18 DQ1 D1
19 DQ2 D2
20 DQ3 D3
23 DQ4 D4
24 DQ5 D5
25 DQ6 D6
26 DQ7 D7
6 Vcc VCC3
22 VCCP
21 GNDP
7 GND
D[7:0]
VCC3
C1 10 uF/25V
C2 0.1 uF
C3 0.1 uF
C4 0.1 uF
C6 0.1 uF
R1 10K VCC3
U1 74LVC2G125
MISO1 2 1A
SCK1 3 2Y
/DVRCS 1 1OE
7 2OE
6 1Y MISO
5 2A SCK
8 VCC VCC3
4 GND
U3 PIC24HJ64GP206
1 RG15
2 RC1
3 RC2
SCK2 4 RG6/SCK2
MISO2 5 RG7/SDI2
MOSI2 6 RG8/SDO2
R4 47K VCC3 /MCLR 7 MCLR
/CS 8 RG9/SS2
9 VSS
VCC3 10 VDD
11 RB5
12 RB4
13 RB3
/DVRCS 14 RB2/SS1
TP2 15 RB1/PGC3
TP1 16 RB0/PGD3
PGC R3 120R 17 RB6/PGC1
PGD R2 120R 18 RB7/PGD1
19 AVDD
20 AVSS
21 RB8/U2CTS
22 RB9
23 RB10/TMS
24 RB11/TDO
25 VSS
VCC3 26 VDD
27 RB12/TCK
28 RB13/TDI
29 RB14/U2RTS
30 RB15
31 RF4/U2RX
32 RF5/U2TX
RG13 64
RG12 63
RG14 62 /WP
RG0 61 /RST
RG1 60 RDY
RF1 59
RF0 58
VDD 57 VCC3
VDDcore 56
RD7 55 D7
RD6 54 D6
RD5 53 D5
RD4 52 D4
RD3 51 D3
RD2 50 D2
RD1 49 D1
PGC2/RC14 48 /BYTE
PGD2/RC13 47
RD0 46 D0
RD11 45 TP5
RD10 44 TP4
U1CTS/RD9 43 TP3
RD8 42 CMD
VSS 41
CLK0/RC15 40
CLKIN/RC12 39
VDD 38 VCC3
SCL1/RG2 37
SDA1/RG3 36
U1RTS/SCK1/RF6 35 SCK1
U1RX/SDI1/RF2 34 MOSI
U1TX/SDO1/RF3 33 MISO1
C5 10 uF 10v ECJ
Z1 8.0 MHz
P54 Main DSP
MISO 1
MOSI 2
SCK 3
/DVRCS 4
CMD 5
/MCLR 6
PGD 7
PGC 8
VCC3 9
10
TP1 1 TP1 TP
TP2 1 TP2 TP
TP3 1 TP3 TP
TP4 1 TP4 TP
TP5 1 TP5 TP
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L Johnson
Title
K3: Digital Voice Recorder
Size A
Document Number 2004090101
Rev XG
Date: Wednesday, June 16, 2010
Sheet 1 of 1

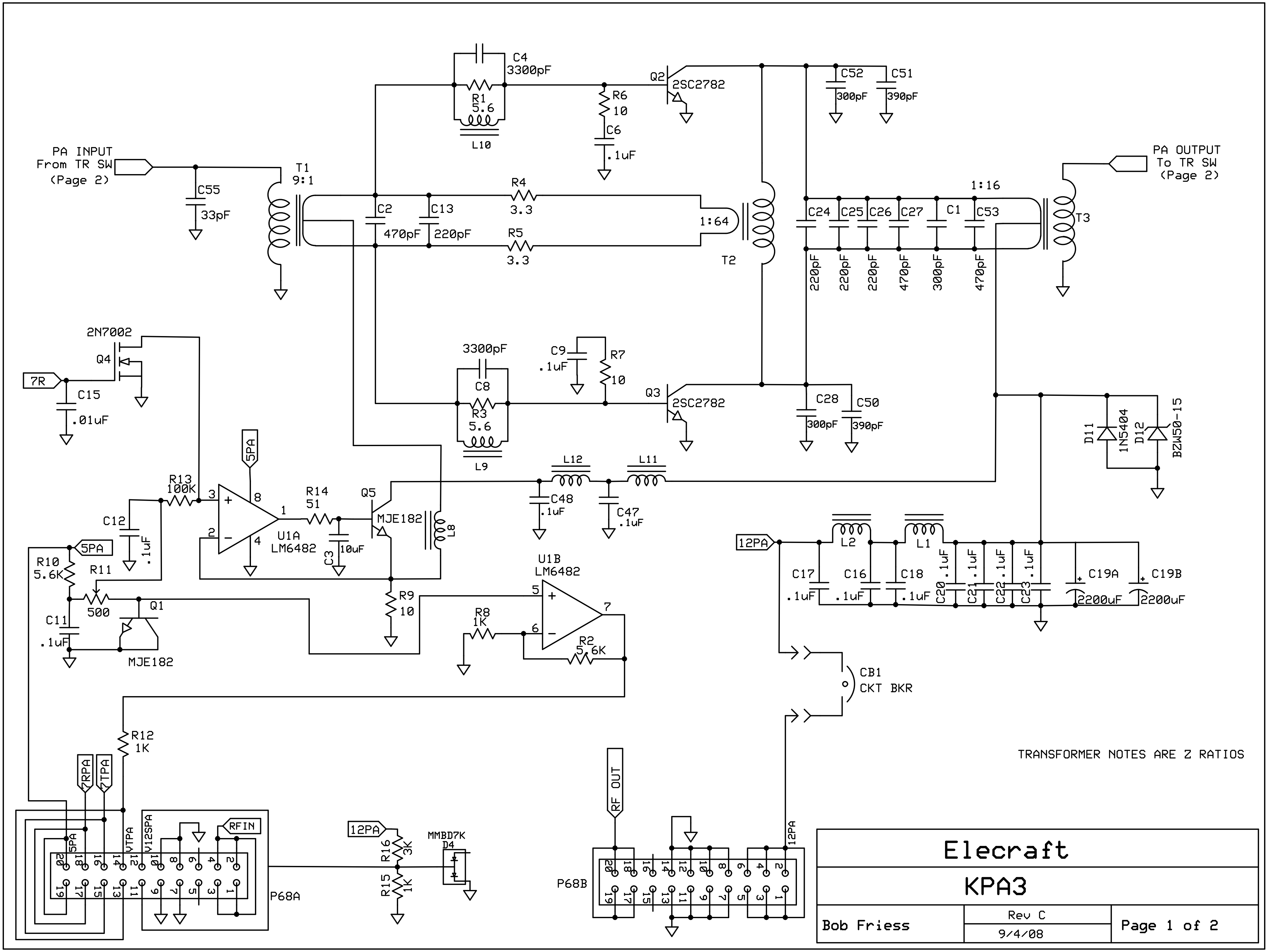


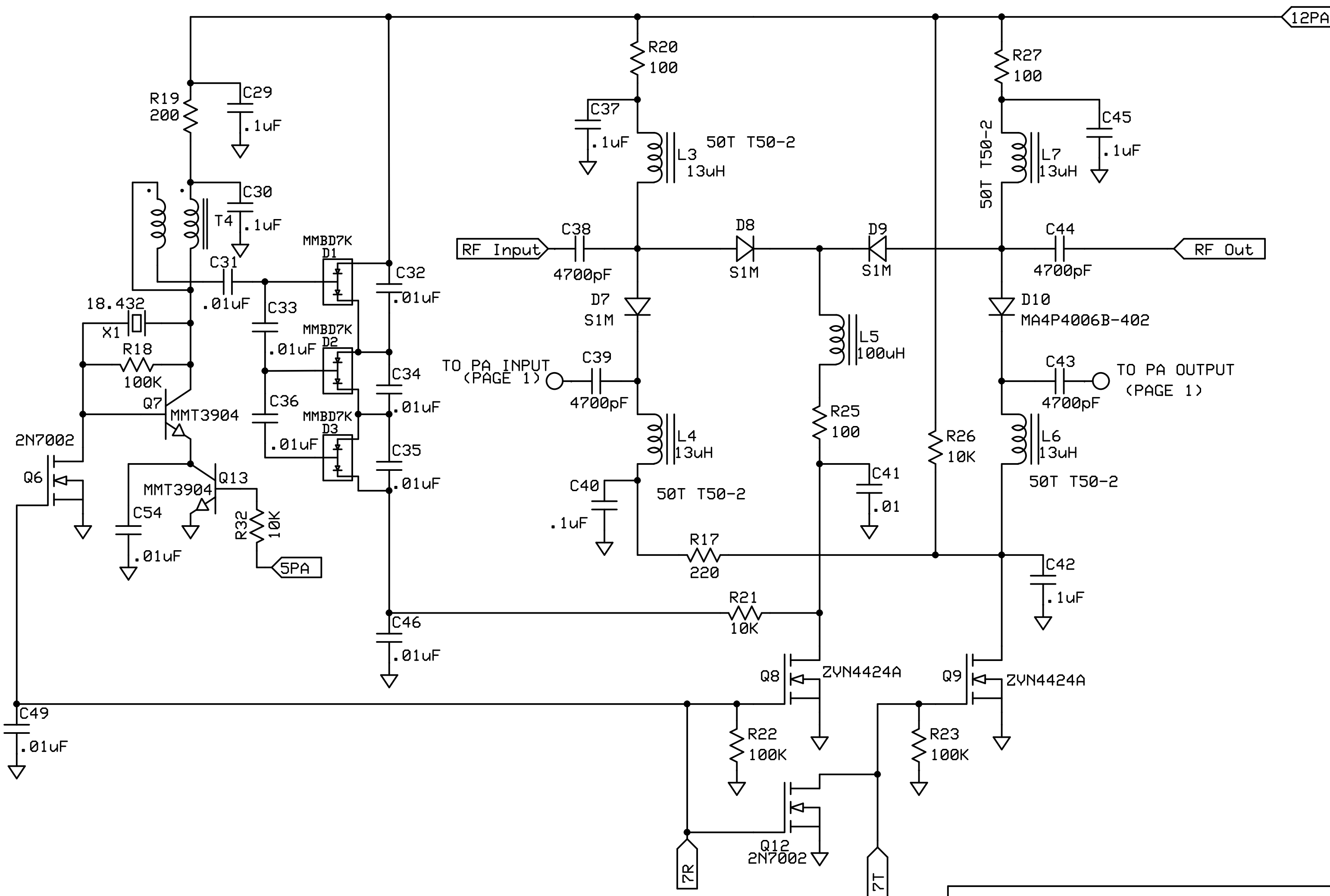
Elecraft

KPAIO3

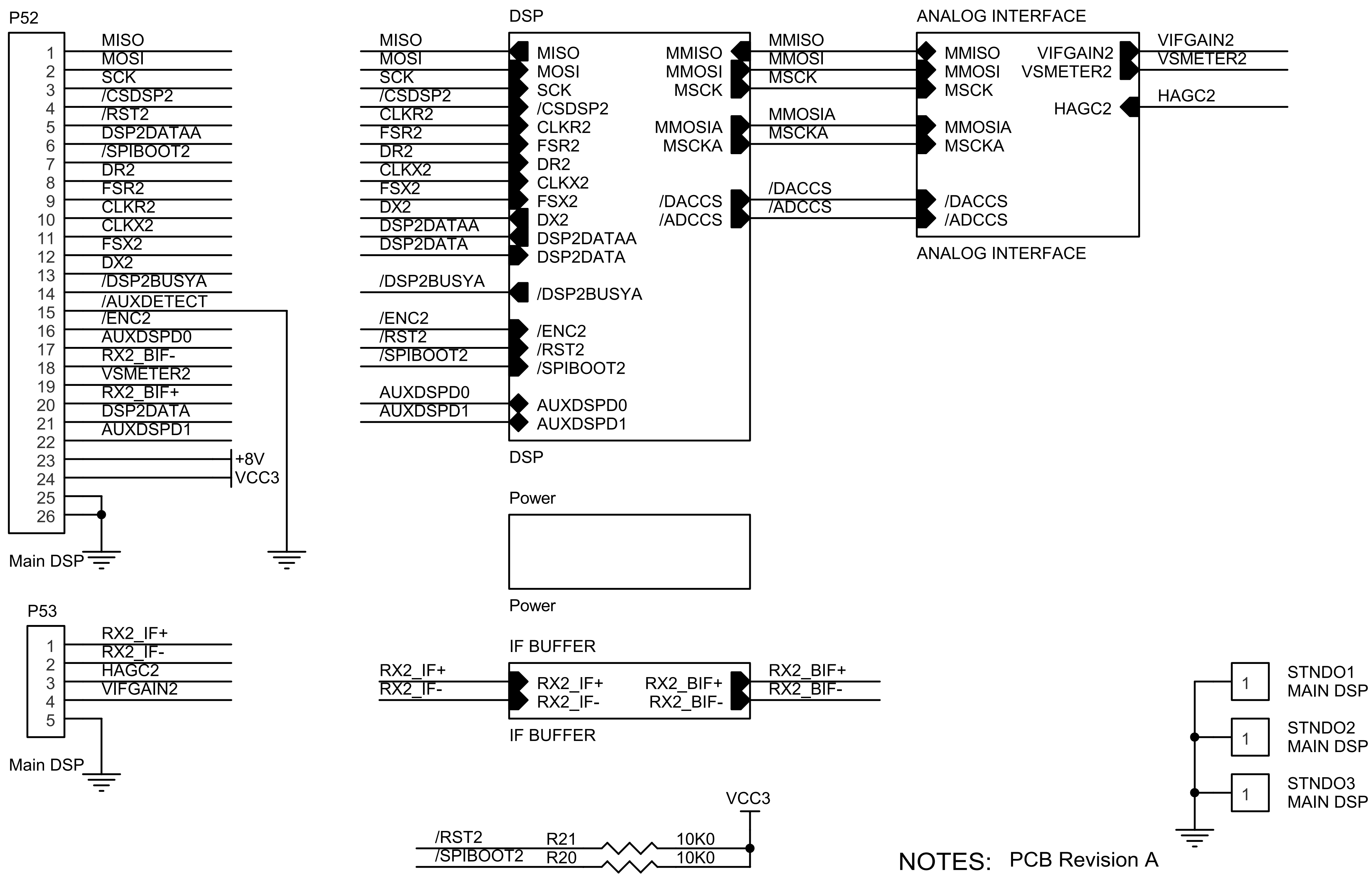
Bob Friess	Rev XI 3/26/2007	Page 1

C:\Projects\K3\Schematics\KPAIO3revXI.sch - Sheet1


PA INPUT
From TR SW
(Page 2)
C55
33pF
T1
9:1
C4
3300pF
R1
5.6
L10
R6
10
C6
.1uF
Q2
2SC2782
C52
300pF
C51
390pF
C2
470pF
C13
220pF
R4
3.3
R5
3.3
1:64
T2
1:16
C24
C25
C26
C27
C1
C53
220pF
220pF
220pF
470pF
300pF
470pF
T3
PA OUTPUT
To TR SW
(Page 2)
2N7002
Q4
7R
C15
.01uF
3300pF
C8
R3
5.6
L9
C9
.1uF
R7
10
Q3
2SC2782
C28
300pF
C50
390pF
D11
1N5404
D12
BZW50-15
5PA
R13
100K
C12
.1uF
U1A
LM6482
R14
51
C3
10uF
Q5
MJE182
L8
L12
L11
C48
.1uF
C47
.1uF
12PA
L2
L1
C17
.1uF
C16
.1uF
C18
.1uF
C20 .1uF
C21 .1uF
C22 .1uF
C23 .1uF
C19A
2200uF
C19B
2200uF
R10
5.6K
R11
500
Q1
MJE182
C11
.1uF
R9
10
U1B
LM6482
R8
1K
R2
5.6K
CB1
CKT BKR
R12
1K
7RPA
7TPA
RFIN
5PA
VTPA
V12SPA
P68A
12PA
R16
3K
R15
1K
MMBD7K
D4
RF OUT
12PA
P68B
TRANSFORMER NOTES ARE Z RATIOS
Elecraft
KPA3
Bob Friess
Rev C
9/4/08
Page 1 of 2



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KPA3		
Bob Friess	Rev C 9/4/2008	Page 2 of 2



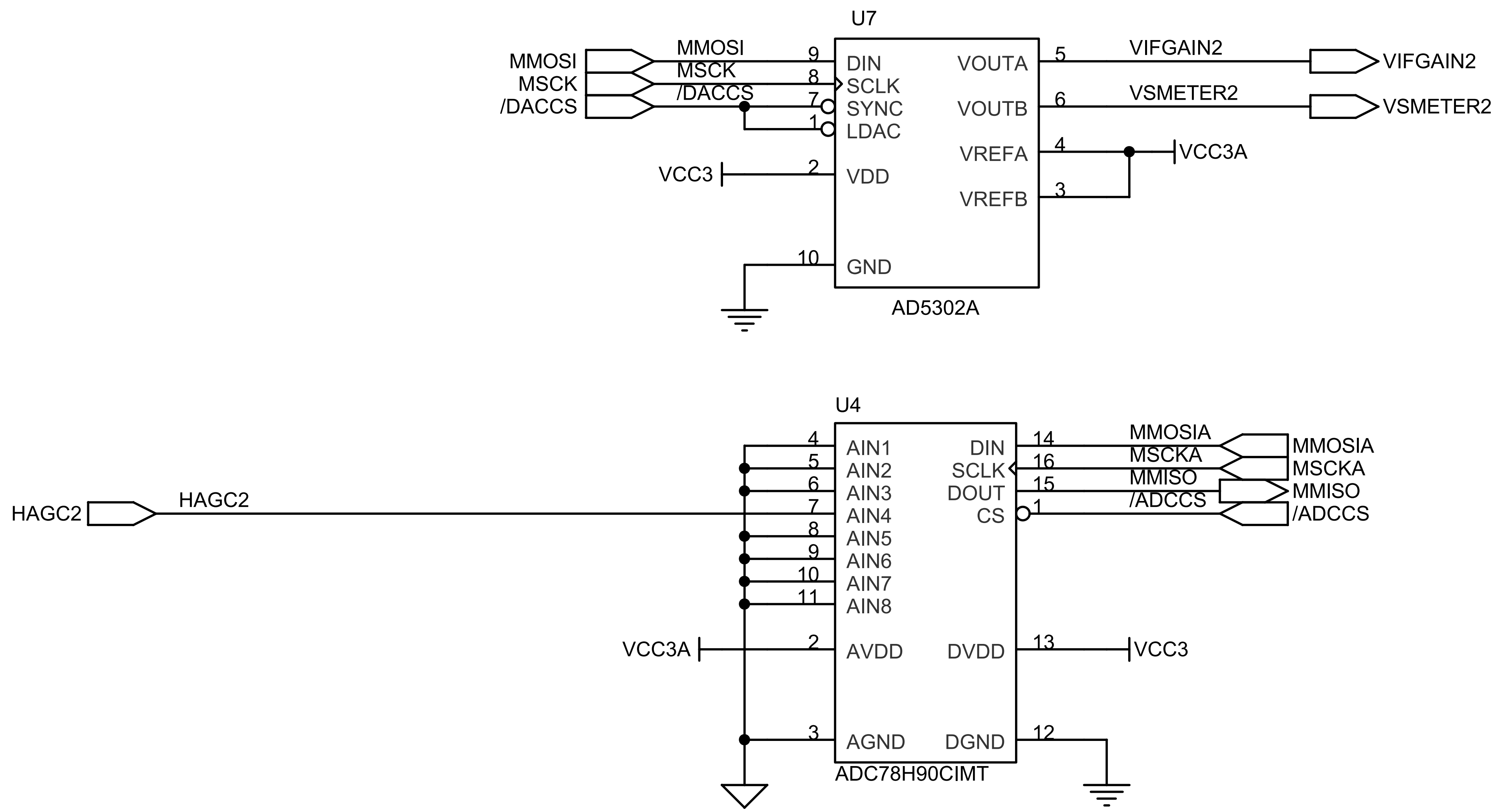
NOTES: PCB Revision A

L Johnson

Title: K3 Aux DSP: Top Level

Size	Document Number	Rev
A	2004051101	A0

Date: Wednesday, June 16, 2010 Sheet 1 of 5



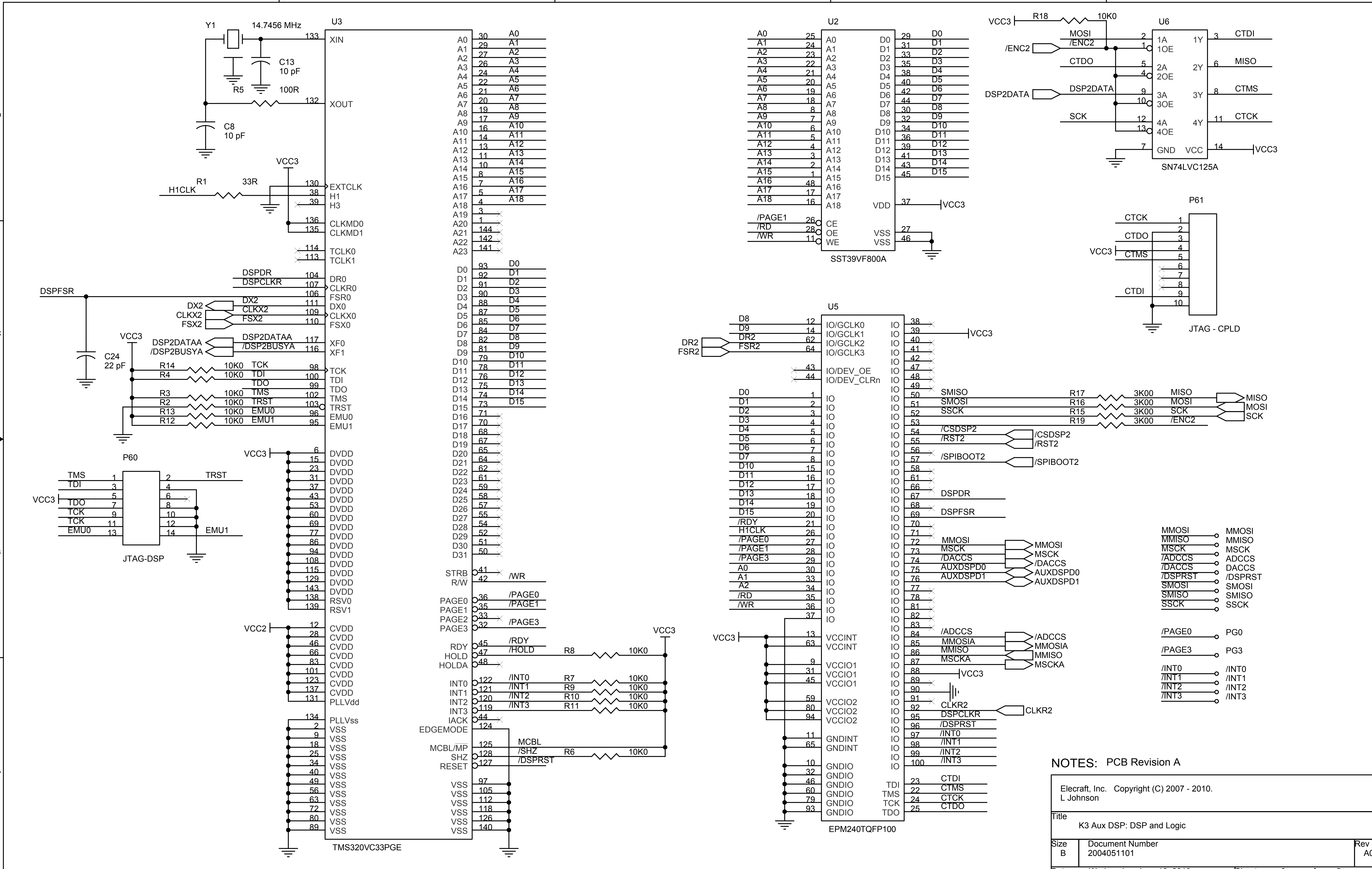
NOTES: PCB Revision A

L Johnson

Title
K3 Aux DSP: Analog Interface

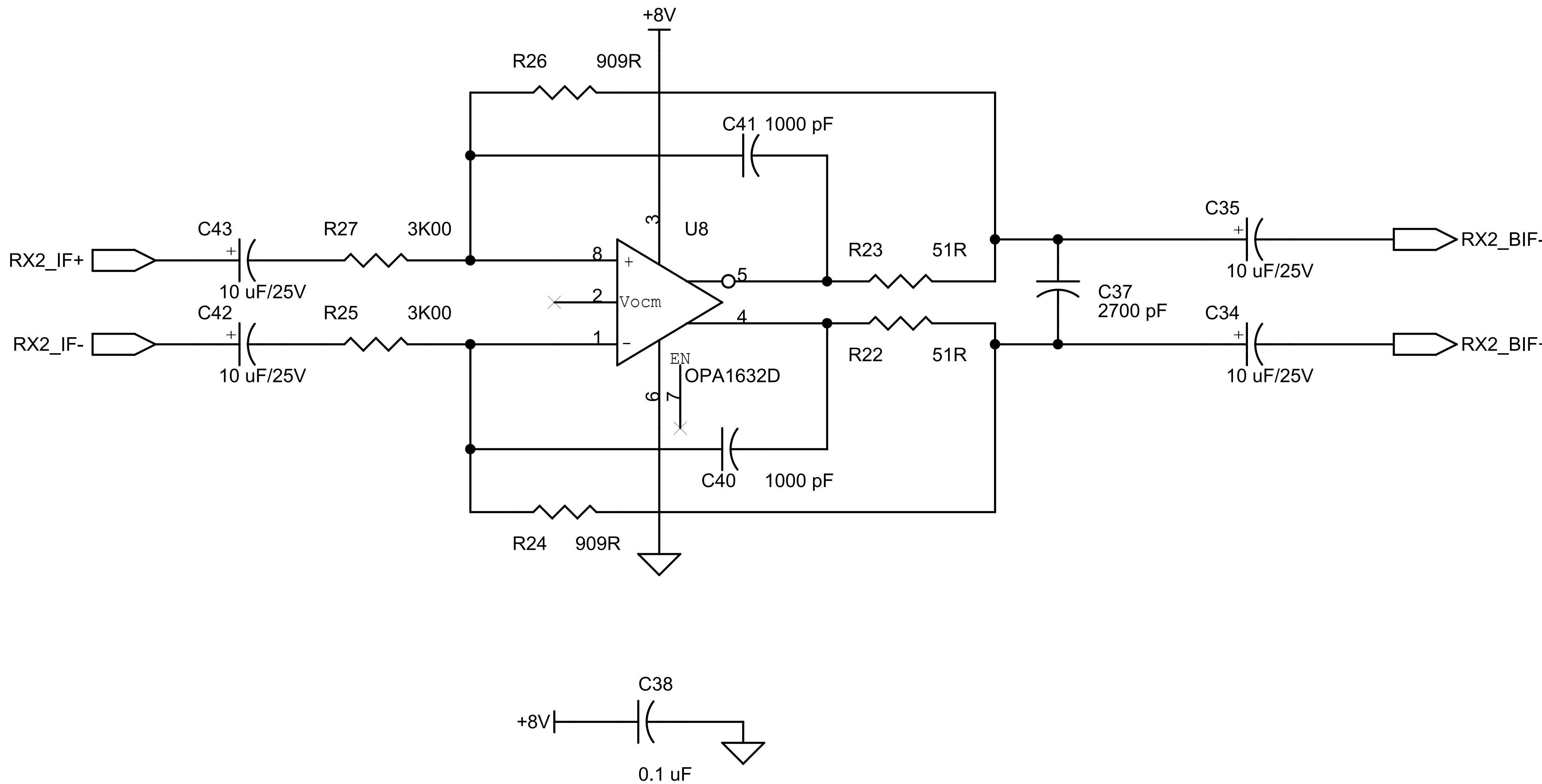
Size	Document Number	Rev
A	2004051101	A0

Date: Wednesday, June 16, 2010 Sheet 2 of 5



NOTES: PCB Revision A

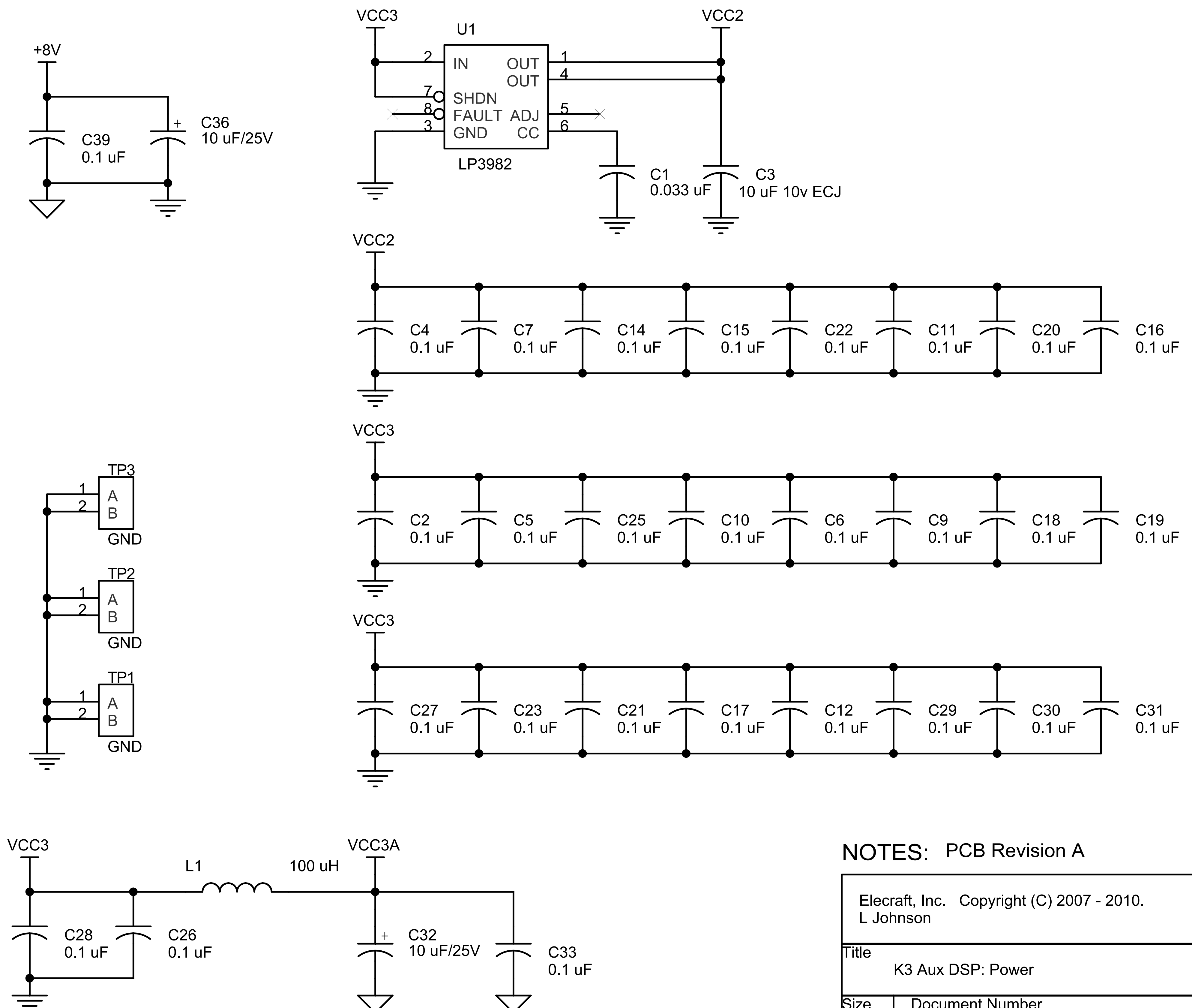
Elecraft, Inc. Copyright (C) 2007 - 2010. L Johnson	
Title: K3 Aux DSP: DSP and Logic	
Size: B	Document Number: 2004051101	Rev: A0
Date: Wednesday, June 16, 2010	Sheet 3 of 5



NOTES: PCB Revision A

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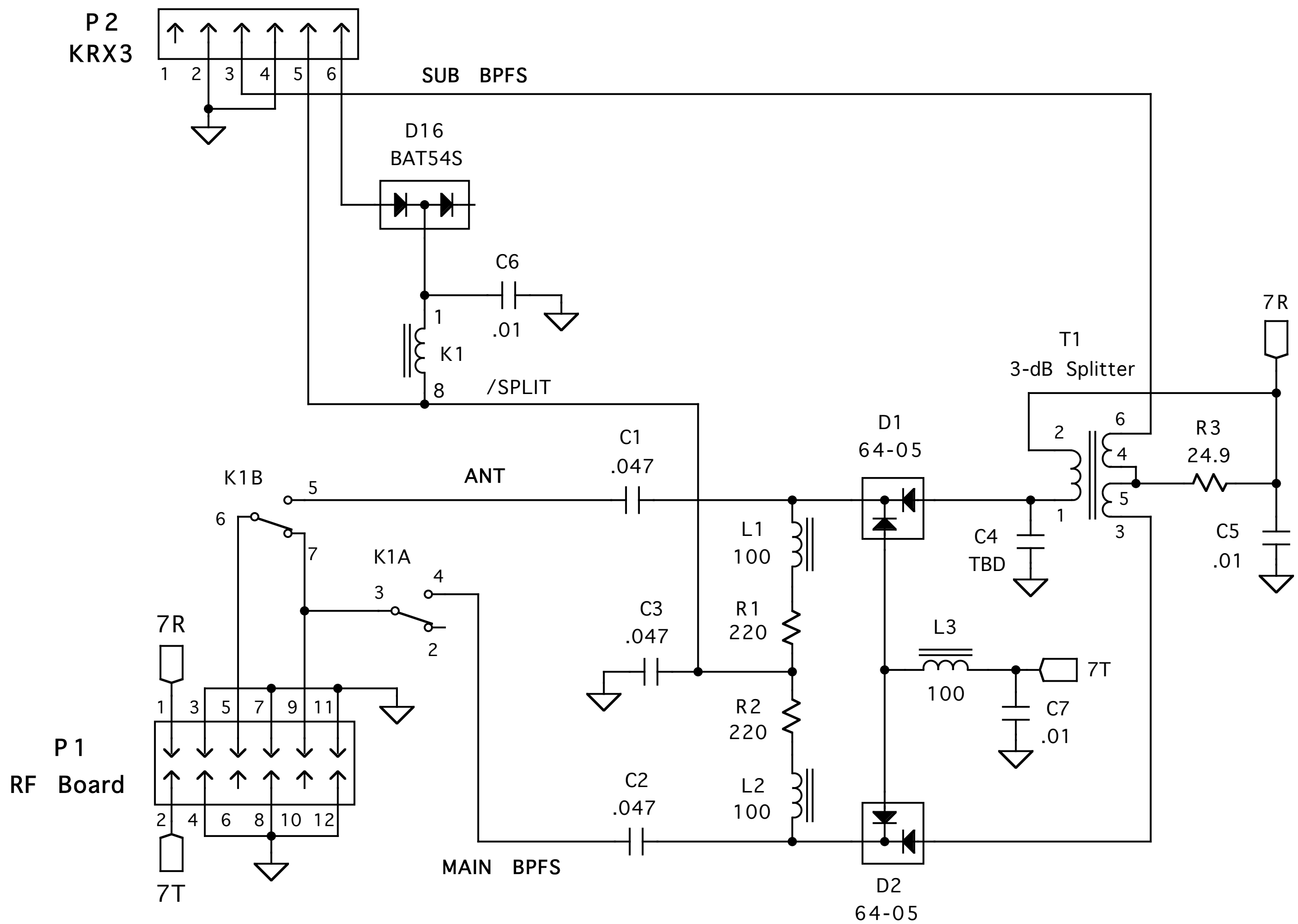
Title: K3 Aux DSP: IF Buffer		
Size: A	Document Number: 2004051101	Rev: A0
Date: Wednesday, June 16, 2010	Sheet 4 of 5	



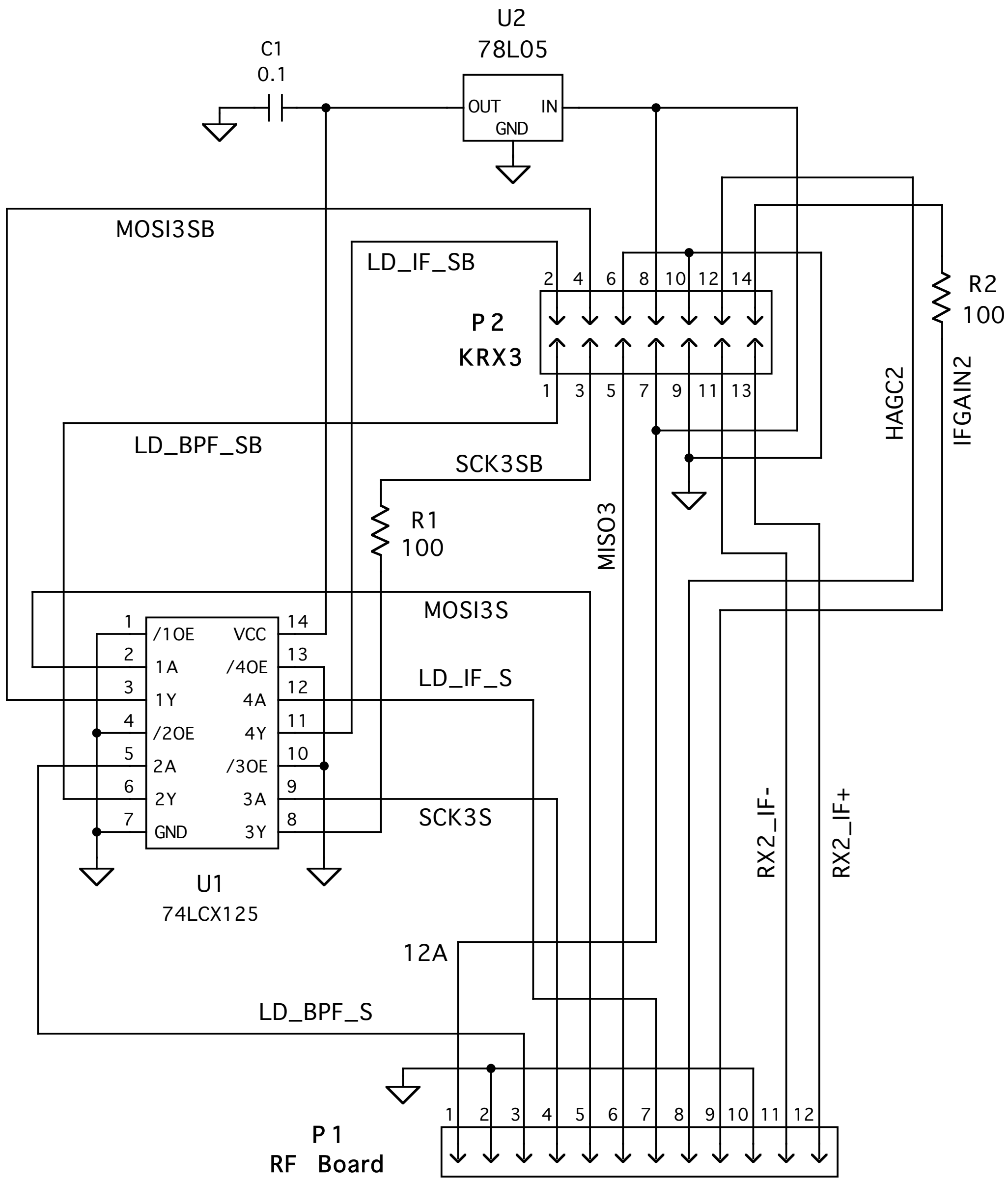
NOTES: PCB Revision A

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Title	K3 Aux DSP: Power	
Size A	Document Number 2004051101	Rev A0
Date: Wednesday, June 16, 2010	Sheet 5 of 5	

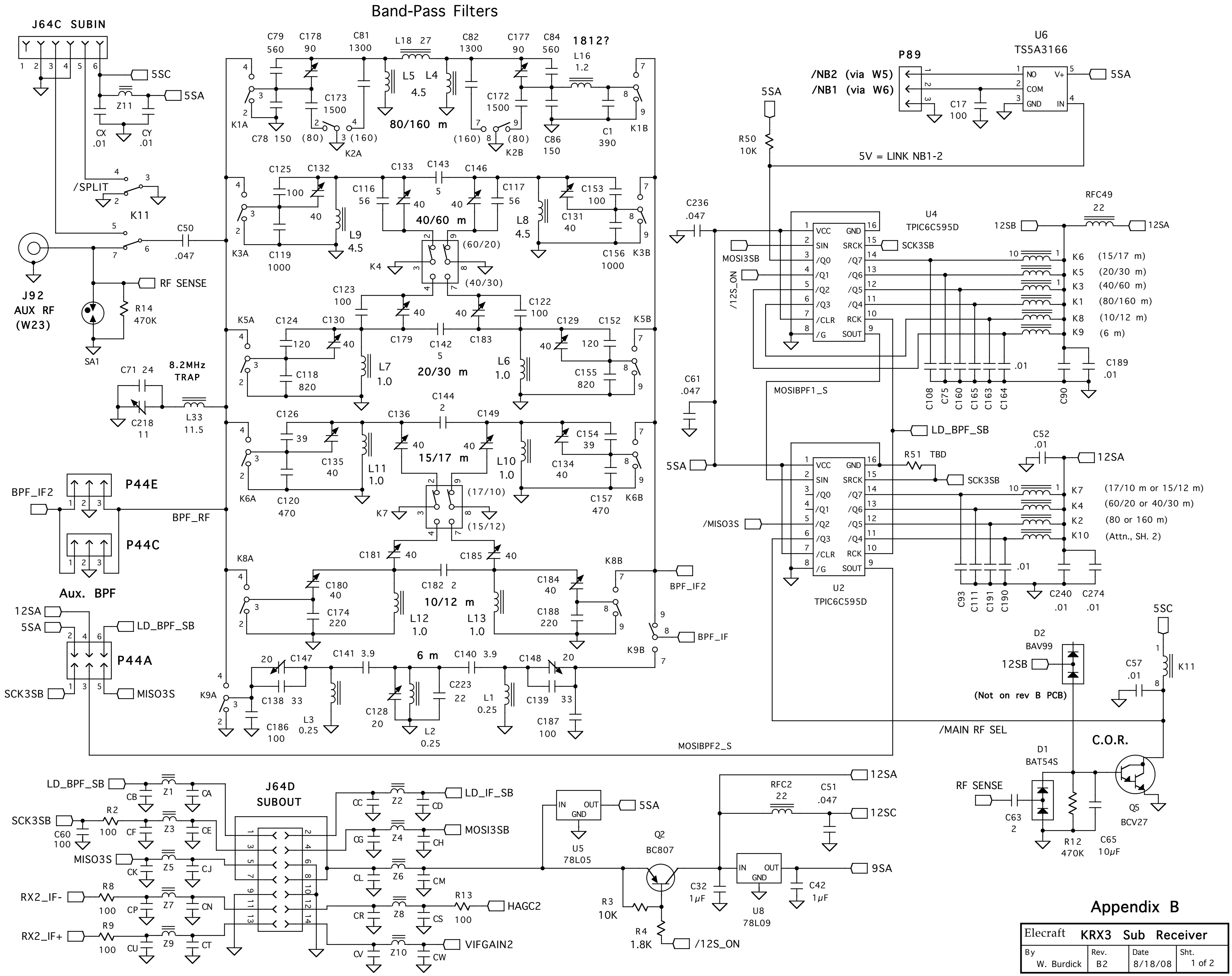


Elecraft	SUBIN Module		
By W. Burdick	Rev. B2	Date 9/18/08	Sht. 2 of 2

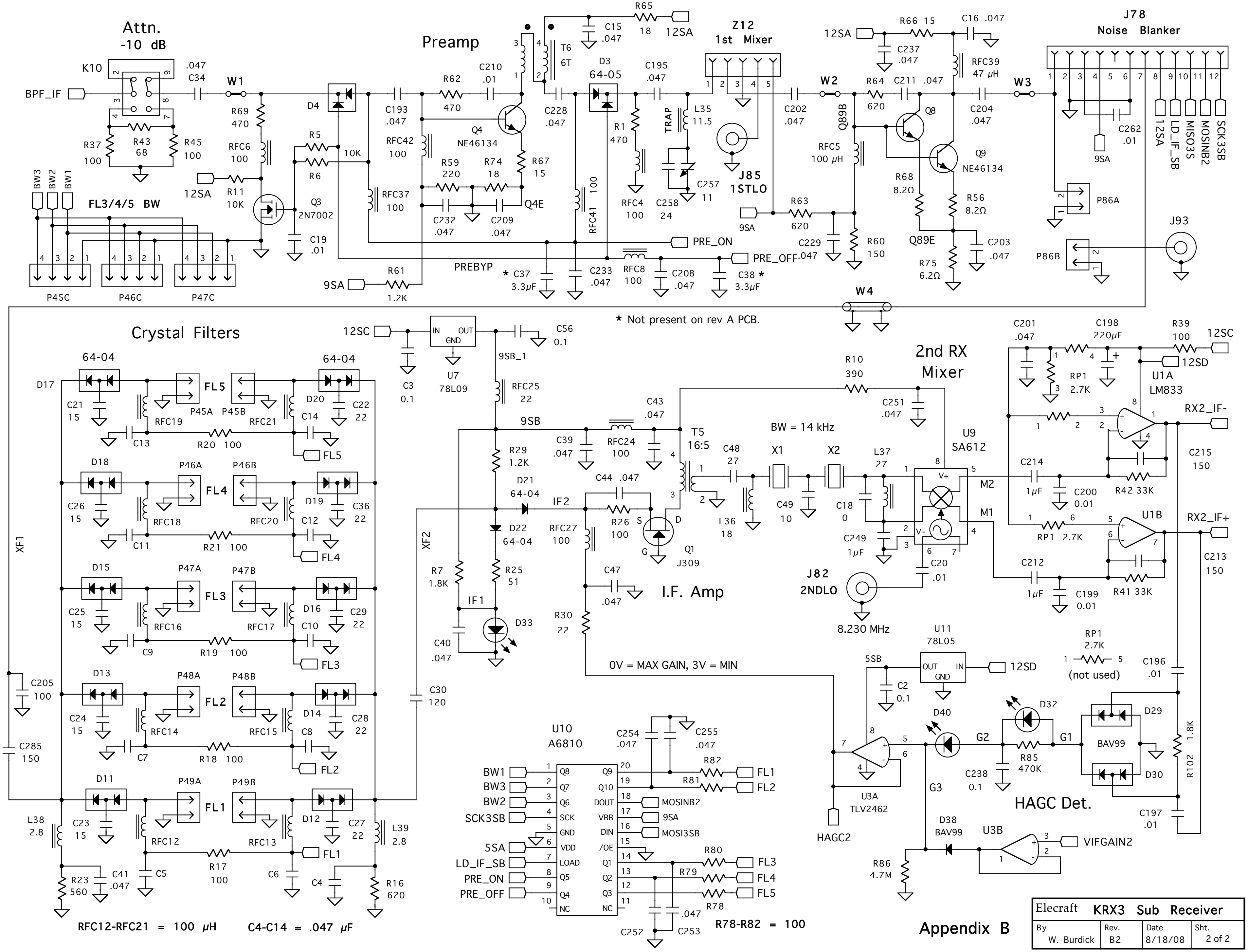


Elecraft	SUBOUT Module		
By W. Burdick	Rev. B2	Date 8/18/08	Sht. 2 of 2

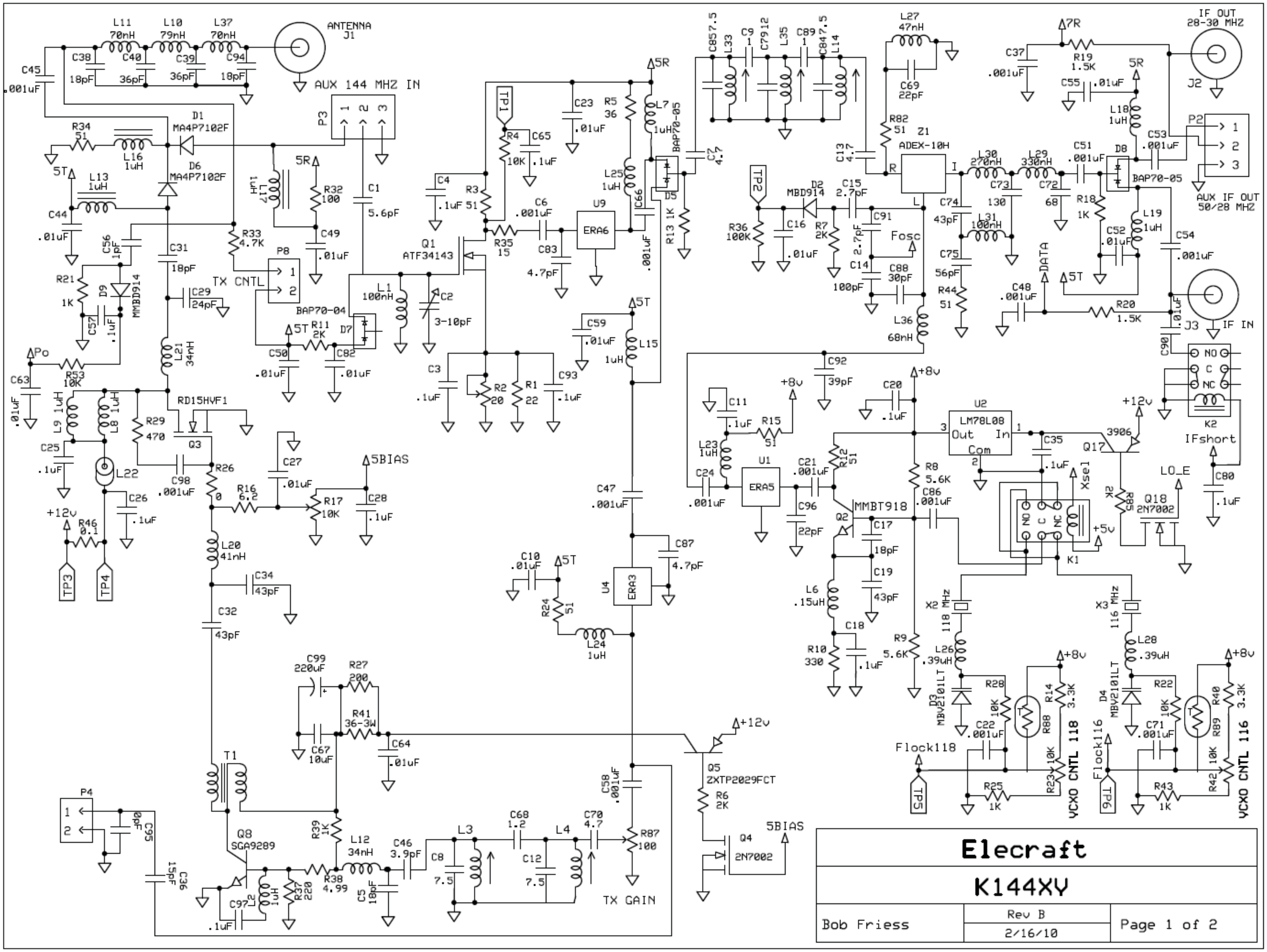
Appendix B

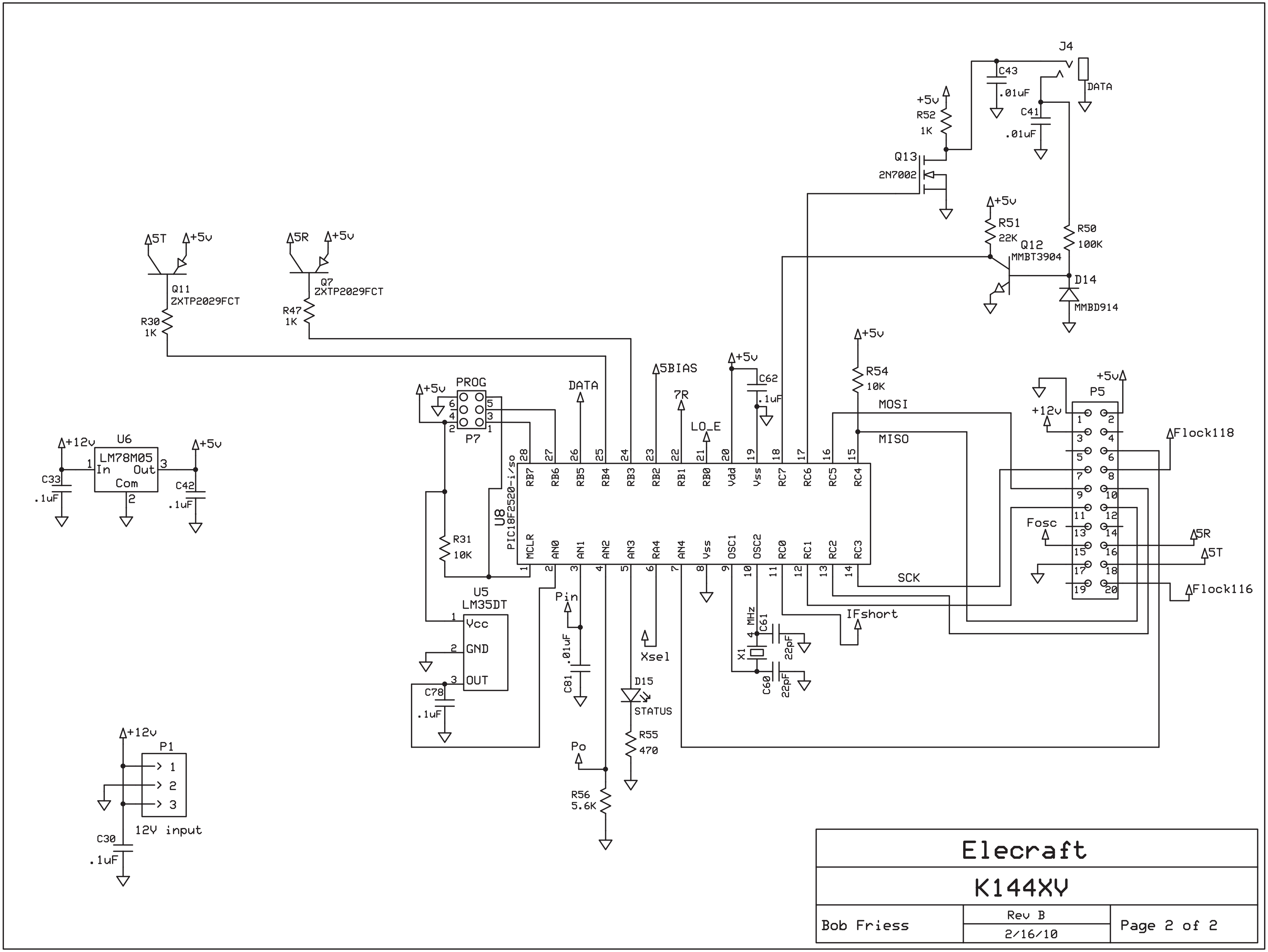


Band-Pass Filters
J64C SUBIN
5SC
5SA
Z11
CX .01
CY .01
/SPLIT
K11
C50 .047
J92 AUX RF (W23)
RF SENSE
R14 470K
SA1
C71 24
8.2MHz TRAP
C218 11
L33 11.5
1812?
L16 1.2
L18 27
L5 4.5
L4
80/160 m
C79 560
C178 90
C81 1300
C82 1300
C177 90
C84 560
C173 1500
C172 1500
C78 150
C86 150
C1 390
K1A
K1B
K2A
K2B
(80)
(160)
40/60 m
C125 100
C132 40
C133 40
C143 5
C146 40
C117 56
C116 56
C153 100
C131 40
C119 1000
C156 1000
L9 4.5
L8 4.5
K3A
K3B
K4
(60/20)
(40/30)
20/30 m
C123 100
C122 100
C124 120
C130 40
C129 40
C152 120
C179
C142 5
C183
C118 820
C155 820
L7 1.0
L6 1.0
K5A
K5B
15/17 m
C144 2
C126 39
C136 40
C149 40
C154 39
C135 40
C134 40
C120 470
C157 470
L11 1.0
L10 1.0
K6A
K6B
K7
(17/10)
(15/12)
10/12 m
C181 40
C185 40
C182 2
C180 40
C184 40
C174 220
C188 220
L12 1.0
L13 1.0
K8A
K8B
6 m
C147 20
C141 3.9
C140 3.9
C148 20
C138 33
C139 33
C128 20
C223 22
C186 100
C187 100
L3 0.25
L2 0.25
L1 0.25
K9A
K9B
BPF_IF2
BPF_IF
BPF_RF
P44E
P44C
Aux. BPF
12SA
5SA
LD_BPF_SB
P44A
SCK3SB
MISO3S
MOSIBPF2_S
P89
/NB2 (via W5)
/NB1 (via W6)
U6 TS5A3166
NO COM GND V+ IN
C17 100
R50 10K
5V = LINK NB1-2
C236 .047
U4 TPIC6C595D
VCC SIN /Q0 /Q1 /Q2 /Q3 /CLR /G GND SRCK /Q7 /Q6 /Q5 /Q4 RCK SOUT
MOSI3SB
/12S_ON
SCK3SB
RFC49 22
12SB
12SA
K6 (15/17 m)
K5 (20/30 m)
K3 (40/60 m)
K1 (80/160 m)
K8 (10/12 m)
K9 (6 m)
C108 C75 C160 C165 C163 C164 .01
C90
C189 .01
C61 .047
MOSIBPF1_S
LD_BPF_SB
R51 TBD
C52 .01
12SA
U2 TPIC6C595D
/MISO3S
K7 (17/10 m or 15/12 m)
K4 (60/20 or 40/30 m)
K2 (80 or 160 m)
K10 (Attn., SH. 2)
C93 C111 C191 C190 .01
C240 .01
C274 .01
D2 BAV99
12SB
(Not on rev B PCB)
C57 .01
K11
/MAIN RF SEL
C.O.R.
D1 BAT54S
RF SENSE
C63 2
R12 470K
C65 10µF
Q5 BCV27
LD_BPF_SB
Z1
CB
CA
SCK3SB
R2 100
C60 100
CF
Z3
CE
MISO3S
CK
Z5
CJ
RX2_IF-
R8 100
CP
Z7
CN
RX2_IF+
R9 100
CU
Z9
CT
J64D SUBOUT
CC
Z2
CD
LD_IF_SB
CG
Z4
CH
MOSI3SB
CL
Z6
CM
CR
Z8
CS
R13 100
HAGC2
CV
Z10
CW
VIFGAIN2
U5 78L05
5SA
Q2 BC807
R3 10K
R4 1.8K
/12S_ON
RFC2 22
C51 .047
12SA
12SC
C32 1µF
U8 78L09
C42 1µF
9SA
Elecraft
KRX3 Sub Receiver
By W. Burdick
Rev. B2
Date 8/18/08
Sht. 1 of 2



Attn.
-10 dB
Preamp
Z12
1st Mixer
J78
Noise Blanker
J85
1STLO
J93
FL3/4/5 BW
Crystal Filters
* Not present on rev A PCB.
2nd RX
Mixer
U9
SA612
BW = 14 kHz
I.F. Amp
J82
2NDLO
8.230 MHz
0V = MAX GAIN, 3V = MIN
U10
A6810
HAGC Det.
RP1
2.7K
(not used)
RFC12-RFC21 = 100 μH
C4-C14 = .047 μF
R78-R82 = 100
Appendix B
Elecraft
KRX3 Sub Receiver
By
W. Burdick
Rev.
B2
Date
8/18/08
Sht.
2 of 2


ANTENNA
J1
AUX 144 MHZ IN
TX CNTL
IF OUT
28-30 MHZ
AUX IF OUT
50/28 MHZ
IF IN
IFshort
LO_E
Xsel
Fosc
DATA
5BIAS
TX GAIN
VCXO CNTL 118
VCXO CNTL 116
Flock118
Flock116
RD15HVF1
ATF34143
ADEX-10H
LM78L08
MMBT918
ZXTP2029FCT
SGA9289
2N7002
Elecraft
K144XV
Bob Friess
Rev B
2/16/10
Page 1 of 2



C:\Projects\K144XV\Schematics\KXV144_8B.sch - Sheet2